

REPORT

OF THE

**COIR BOARDT DELEGATION
TO CEYLON**



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G.P.E -1959

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INTRODUCTORY

Appointment of the Delegation

The Coir Board, after its formation, appointed a number of Committees to study the various aspects of the Coir Industry in India. Of these Committees, the Ad hoc Committee for External Marketing took note of the considerable quantities of mattress and bristle fibre exported from Ceylon to foreign countries and suggested that in such areas where natural facilities for the retting of coconut husk are not available or do not exist, the possibilities of developing the extraction of bristle fibre and mattress fibre as in Ceylon should be examined and this view was also supported by the other Committees such as the Ad hoc Committee for Husk and Fibre. The Coir Board at its 6th meeting decided that a closer study should be made into the question of producing mattress and bristle fibre in places where there are no natural retting facilities. The Board at its next meeting held in Mysore on the 25th February 1956 resolved to appoint a delegation to make an on-the-spot study of the possibilities of manufacturing mattress and bristle fibre and also to study the methods adopted in Ceylon for the manufacture of these fibres and examine the possibilities of applying those methods to conditions prevailing in the various States of India. The following were appointed as members of the delegation :—

- (1) Shri S. C. Roy,
- (2) „ A. Karunakara Menon,
- (3) „ N. Narayana Kurup,
- (4) „ S. R. Kaiwar, I.C.S., (or a representative nominated by the Andhra Government),
- (5) „ B. Beerappa, I.A.S., (or a representative nominated by the Mysore Government), and
- (6) „ P. K. Dewar.

Shri S. R. Kaiwar was appointed convener of the delegation. Subsequently, the Andhra Government nominated Shri B. Narasimha Rao, Joint Director of Industries and Commerce,

as their representative in place of Shri S. R. Kaiwar and the Mysore Government nominated Shri M. C. Mathews, Coir Expert, Government of Mysore, as their representative in place of Shri B. Beerappa. The Coir Board accepted the above nominations and appointed Shri P. K. Dewar as leader of the delegation.

Itinerary of the Delegation

The first meeting of the delegation was held on the 25th September 1956 in the Office of the Coir Board at Ernakulam, when Shri T. M. B. Nedungadi, Chairman of the Board, was present and presided over the meeting. After a general discussion on the scope of the enquiry by the delegation, it was decided that the delegation should not merely confine their enquiries to the possibilities of production of mattress and bristle fibre in India but should also try, during the course of their tours, to ascertain the general condition of the coir industry in the States they visit and make a report to the Board on any possible lines of development. It was also decided that the delegation should visit the various coconut growing States in India in two parts. Accordingly, the delegation assembled at Calcutta on the 9th November 1956 and toured the States of West Bengal, Orissa and Andhra Pradesh. The members of the delegation visited in West Bengal the coconut growing areas of Andhul-Mouli, Sankrail and Ramachandrapur, some rope manufacturing factories in Calcutta and a small door-mat factory in Ultadanga Road and the Government Coir Demonstration Centre at Behala, besides coir and mattress markets at Chandnichowk, Hoggs market and Amrutala coir market. In addition to discussions with the officers of the Government of West Bengal, the members of the delegation had also the benefit of a discussion with the Chief Minister of West Bengal, Dr. B. C. Roy. Leaving Calcutta on the 13th evening, the delegation toured in Orissa State from the 14th to 16th November 1956, during which period the members visited Puri, Sakhigopal, Bhubaneswar and Gopalpur. The delegation had also discussions with the Registrar of Co-operative Societies, Joint Registrar and other officers of the Orissa Government. The delegation toured the coconut growing areas of Andhra Pradesh from 17th to 21st November 1956 during which period, they visited Palasa, the Government Coir Industrial School at Baruva, Narsapur, the Coir Soaking and Retting Centre at Antarvedi, the Coir Production-cum-training Centre at Kakinada, etc. The members of the delegation also

visited the manufacturing yard of Messrs. Ripley & Co. (Private) Ltd., who were engaged in baling and exporting of coir yarn and held discussions with the Chairman and Secretary of the East Godavari Market Committee. The delegation met at Madras on the 22nd and 23rd November 1956 and prepared a draft of the preliminary report in respect of the first part of the tour.

The members of the delegation re-assembled at Bombay on the 5th December 1956 and toured in Bombay State until 10th December 1956. During this period, they visited the Technological Laboratory of the Indian Central Cotton Committee, Matunga, and acquainted themselves with the work being done by Mr. G. N. Prabhu, the Coir Board's Technologist. The delegation also saw the manufacture of brushes on cottage industry basis at Bycullah and the use of coir matting in the construction of walls by one Mr. Mulvaney, Consulting Architect, by gunniting a mixture of cement and sand on a matting of coir yarn. The members of the delegation visited Guhaghar in Ratnagiri district and held discussions with the Joint Registrar of Industrial Co-operatives, Bombay State, at Poona.

The delegation visited Mysore State from 11th December 1956 to 15th December 1956, during which period the members visited the Government Coir Factory-cum-training Institute at Honavar, the Coir Extraction and Spinning Institution at Bandehalla, the Government Coir Manufacturing School at Kumta, the Government Coir Factory at Nanjangud and the surrounding areas. Special mention must be made of the visit of the delegation to Arsikere where one Mr. M. S. Hanumantha Rao has installed a factory since 1949 for the manufacture of mattress and bristle fibre using power-operated machines. It was subsequently found that the machines in use in this factory were similar to those employed in Ceylon for this purpose. This is the only factory of its kind in India that came to the notice of the delegation.

The members of the delegation toured in the Madras State from 16th to 20th December 1956. They visited Ayyampalayam, Sundaikkai, Thailampalaya, Thotiyam and Chipleputhur, all villages in the coconut growing parts of Tiruchirappalli District and Rajamadhan and Adhirampatnam in Tanjore District. Some of the members also visited Tiruchendur, Kulasekharapuram and Malapuram in Tirunelveli District. The members finalised the preliminary report in regard to the

second part of their itinerary at Tenkasi and dispersed from Tenkasi on 20th December 1956. (Copies of the detailed tour notes are appended.)

The Government of India decided that the delegation to Ceylon may be a smaller body and may consist of the following :—

- (1) Shri P. K. Dewar (Leader),
- (2) „ B. Narasimha Rao, Joint Director of Industries and Commerce, Andhra Pradesh,
- (3) „ A. Karunakara Menon, and
- (4) „ S. C. Roy.

After necessary arrangements were completed by the Government of India for the visit of the delegation to Ceylon, the delegation consisting of the above four members assembled at Madras on the 7th August 1958 and left for Colombo on the 8th August 1958. The members were received by the representatives of the Ceylon Government Commerce Department and the Indian High Commission. The members toured in Ceylon from 9th to 16th and left for Madras on the 17th August 1958. After drafting tour notes on the 18th, the members dispersed from Madras on the 19th. During their stay in Ceylon, the members visited fibre mills at Hendalawattala and Weligampitiva-Jaela, Maravila Coconut Producers Co-operative Society's factory at Maravila, Sandalanka Coconut Producers Co-operative Society's factory at Sandalankawa, Moosajee's Fibre Stores and Baling Plant at Colombo and the Government Coconut Research Institute at Lunavilla. The delegation also visited the coir manufacturing factory run by the Katunayake Co-operative Coir Societies Union and a few co-operative societies engaged in coir retting and manufacture of coir yarn and coir products, mainly in the southern part of Ceylon. The members of the delegation had also consultations with the officers of the Commerce and Rural Industries Departments of the Government of Ceylon, as also with Shri Gandaviya, High Commissioner for India in Ceylon and Shri V.C. Vijayaraghavan, First Secretary (Commercial), Indian High Commission.

The members of the delegation kept detailed day-to-day tour notes of their visits to the several centres both in India and in Ceylon and copies of these tour notes are annexed to this report.

COCONUT CULTIVATION IN INDIA

India is the second largest coconut growing country in the world next only in importance to Philippines, as will be seen from the following statement :—

Sl. No.	Countries	Area in million acres	Production in million nuts
1.	Philippines	2.48	4,916
2.	India	1.58	4,131
3.	Indonesia	1.50	3,200
4.	Ceylon	1.07	2,147

The distribution of area under coconut cultivation among the different States in India is as follows :—

Sl. No.	States	Area in acres	Production of nuts in thousands
1.	Kerala	1,088,417	2,713,973
2.	Mysore	212,944	558,935
3.	Madras	131,290	426,847
4.	Andhra Pradesh	84,636	315,139
5.	Bombay	20,331	30,021
6.	Bengal	16,500	22,205
7.	Oriassa	11,208	32,647
8.	Laccadives	7,269	15,474
9.	Andamans	4,293	2,500
10.	Assam	2,000	12,787
Total		1,578,888	4,130,528

(Statements taken from *Coconut Bulletin*, August 1957)

From the foregoing statement, it will be seen that the acreage under coconut cultivation in Kerala works out to about 68 per cent of the total acreage under coconut in the whole of India. This fact coupled with the natural retting facilities available in Kerala has contributed to the development in this region of the coir industry, more particularly the production of good quality retted fibre, suitable for the manufacture of superior coir yarn and other coir products. However, as the acreage under coconut in the other States of India is as much as 30 per cent of the total acreage, the question of proper utilisation of the husks in these other States is also of particular importance.

AN OUTLINE OF THE COIR INDUSTRY IN THE DIFFERENT STATES OF INDIA

Accurate statistics relating to the production of coir and coir goods in India are not available. The Ad hoc Committee

for Internal Marketing appointed by the Coir Board has estimated the annual production of coir fibre as 130,000 tons. This figure has been worked out on the basis of the coir goods produced primarily in Kerala. The production of coir fibre and other coir products in the other States is comparatively very small and figures of production in respect of them are not available. As already observed, Kerala accounts for 68 per cent of the total acreage under coconut in India and taking advantage of the stretches of backwaters existing in this region, the production of good quality soft fibre by natural retting has been developed in this region. This fibre has lent itself to the production of superior quality coir yarn and other coir products such as mats and mattings, etc. This industry has resulted in the utilisation of over 60 per cent of available husk in this area.

Unlike Kerala, retting facilities are available only to a limited extent in the other coconut growing areas. It has also to be mentioned here that in most of these States, coconuts are plucked with a view to their utilisation for edible purposes and not for the production of copra for the oil industry. As such, the nuts are dehusked only some weeks after they are plucked, by which time the husks naturally get dried up. Even then, the nuts are not dehusked completely and a portion of the fibre is left intact on the nuts to ensure their safe transport without breakage. This practice militates against the production of good quality fibre by the retting process. As such, only coarse fibre and yarn of inferior variety are being produced in these areas. The production of good quality retted fibre on lines similar to those in vogue in Kerala is however being gradually introduced in some parts of these States where retting facilities are available by the establishment of training and production centres by the respective State Governments.

The following is a brief resume of the conditions of the coir industry as existing in each of these States :—

Kerala

Along with agriculture, coir production is a way of life for a very large section of the people in Kerala especially in the backwater areas of the State. The production of coir yarn has been in vogue in Kerala for over two centuries now. It is one of the biggest cottage industries in Kerala giving occupation to many lakhs of people, more especially to the poorer classes of women. Yarn is spun both by hand and on the spinning

wheel. The latter is said to be of European origin. The advent of Europeans to Kerala and the scope for export of coir yarn into Europe gave rise to the growth of the industry in Kerala. The manufacture of mats and mattings out of coir was also first introduced by the Europeans. The presence of brackish lakes and lagoons at regular distances and the availability of plenty of coconuts all round these lakes and lagoons and a foreign market for yarn and other coir products have greatly contributed to the growth of this industry in Kerala, especially in Travancore-Cochin. It must be said that while the manufacture of coir yarn and products has developed considerably in Travancore-Cochin area of the Kerala State, the industry is not so fully developed in the Malabar area of the State. While about 80% of the husks in Travancore-Cochin are utilised for producing fibre and yarn, only about 40% are utilised in Malabar.

Almost all the fibre produced in Kerala is processed into yarn and other products and the export of fibre as such is negligible.

West Bengal

The coconut cultivation in West Bengal is at present largely confined to areas where there are no regular backwater facilities. As such, the scope for the production of superior quality coir fibre and yarn is extremely limited. However, there are a large number of fresh water tanks and pits, which can be used for soaking husks and producing mattress and bristle fibres. Taking advantage of the favourable market conditions in Calcutta for mattress fibre, a limited quantity of hard fibre of a coarse variety is at present being produced by private individuals. The market conditions are highly favourable for the development of mattress and bristle fibre manufacture in this State. It may be also mentioned that in and around Calcutta, a number of factories have been established for the production of ropes, including coir ropes. For the latter, yarn obtained from the West Coast is utilised.

Orissa

In Orissa, coconut cultivation is confined mainly to parts of Puri and Ganjam districts. Retting facilities are available to a limited extent in these areas and the State Government are making efforts to develop the production of coir fibre, yarn and other coir products by establishing co-operative societies for the

purpose. The industry is however still in a nascent state and may be developed further. The manufacture of mattress and bristle fibre may be also attempted in places such as Sakhigopal where coconuts and fresh water for soaking are available.

Andhra Pradesh

The area under coconut cultivation in this State is confined mainly to the three coastal districts of East Godavari, West Godavari and Srikakulam. The East Godavari district in particular has a considerable area under intensive coconut cultivation. As this area is very fertile and irrigated, the yield of coconuts per acre is very much higher than in any other part of India, the State average being over 3,500 nuts per acre. Retting facilities exist in the coastal belt, particularly in Srikakulam and East Godavari districts. Taking advantage of these facilities, the Andhra Pradesh Government have established training-cum-production centres for the development of coir industry on lines similar to those in Kerala and there is scope for the development of this industry in the coastal areas. In common, however, with other States, coconuts are not dehusked in this State also until after a month of the plucking, and even then, the nuts are not completely dehusked. The available husk is therefore not sufficiently green for retting purposes. These husks can however be gainfully utilised for the manufacture of mattress and bristle fibre. Taking into account the fact that there are nearly a lakh of acres under intensive coconut cultivation in a limited, compact and contiguous area, it is considered that there is considerable scope for the establishment of the mattress and bristle fibre industry in the State, apart from the development of the coir yarn industry on the coast.

Bombay

Consequent on the transfer of the North Kanara district to Mysore State, the acreage under coconut cultivation in the State of Bombay has come down to about 20,000 acres and this area is largely confined to the coastal districts of Colaba and Ratnagiri. These districts possess retting facilities on a small scale and the Government of Bombay are trying to develop the manufacture of coir fibre, yarn and other coir products by the establishment of training-cum-production centres. This industry has not however made appreciable progress so far. Taking into account, however, the fact that Bombay city

offers excellent marketing facilities for mattress and bristle fibres, it is considered that it is possible to develop in this area the manufacture of mattress and bristle fibre.

Mysore

With the addition of North Kanara from Bombay State and South Kanara from Madras State, the total acreage under coconut cultivation in the Mysore State has increased considerably and now stands at 212,944 acres. Natural facilities for retting exist in both North and South Kanara districts and the efforts of the erstwhile Bombay Government for the development of the coir industry in the coastal areas of the North Kanara district such as Honaver, Kumta, etc., have begun to bear fruit. Three coir extraction and spinning institutions are working in different parts of the coastal areas of the North Kanara district, besides a factory-cum-training institute at Honaver and a peripatetic school at Kumta giving training in the manufacture of coir products such as mats, mattings and other fancy articles.

In the rest of Mysore State, where there are about 170,000 acres under coconut cultivation, it cannot be said that the conditions are conducive to the development of commercially good yarn industry, though the Mysore Government have started two training-cum-production centres one at Nanjangud and the other at Hosadurga. Even though these institutions have been in existence for some years now, it was observed that the villages even in the surrounding areas of these institutions have not taken up the production of coir yarn or other articles themselves. However, there is considerable scope for the development of the mattress and bristle fibre industry on a commercial scale in the State. The delegation had occasion to see the working of a small fibre mill at Arsikere established by one Mr. Hanumantha Rao for the manufacture of mattress and bristle fibre from coconut husk. At the time of the delegation's visit, the factory was not being worked regularly, it was said, for want of funds. This is the only fibre mill in India for the manufacture of bristle and mattress fibre.

Madras

The area under coconut cultivation in the Madras State at present is only about a lakh of acres consequent on the transfer of Malabar and South Kanara districts to Kerala and Mysore States, respectively. This acreage is mostly in Tanjore district and to a smaller extent in Trichinopoly district. It is

felt that the coir yarn industry can be developed to a limited extent in the coastal areas where backwater or similar facilities exist. Besides, there is scope for the development of the mattress and bristle fibre industry in the Tanjore and Trichinopoly districts, where coconuts as well as fresh water tanks for soaking are available.

AVAILABILITY OF HUSK

It will be seen from the statement furnished in respect of production of coconuts in the various States in India that 41 crores of nuts are produced annually. The entire quantity of husks of these 41 crores is not now being used for extracting fibre. The Ad hoc Committee on Internal Marketing appointed by the Coir Board has estimated that the annual production of coir fibre in India is about 130,000 tons. It has also been estimated that 1,000 husks yield about 180 pounds of soft fibre. On the basis of this figure, it is seen that only 40 per cent of the husks available in the country are being used for the extraction of fibre. At present, only a negligible quantity of mattress and bristle fibre is being produced. As regards the usage of husks, though 40 per cent is the average figure for the whole of India, it has to be remembered that it is only in Kerala State and in particular in Travancore-Cochin area that about 80 per cent of the husk is being utilised. In the rest of the Kerala State, particularly in the erstwhile Malabar area, the usage of husk is only about 40 per cent. In the other States of India which account for 30 per cent of the total acreage under coconut, the usage of husks is estimated to be only of the order of 5 to 10 per cent but no accurate figures are available. As already stated, it is only in the coastal regions of Kerala where there are natural retting facilities that good quality soft fibre suitable for yarn production is being produced. Steps are being taken in the other States, which possess retting facilities such as Andhra Pradesh, Madras, Mysore and Bombay States, etc., to develop the production of fibre by the retting process but the progress is slow. This is also due to the fact that in these areas, the coconuts are dehusked several weeks after their plucking by which time the husks get dry. Further, in these areas, the manufacture of copra for oil pressing has not made headway. The nuts are mostly sent out to other parts of India for edible purposes. As such, the nuts are not completely dehusked and a certain quantity of fibre is left on the nuts. It may be observed in passing that in these States, there is production of a certain quantity of hard fibre by the soaking process for making coarse yarn and

ropes and this fibre is also used to some extent as mattress fibre. As already stated, the manufacture of mattress and bristle fibre using mechanical equipment has at present been attempted at only one place in India, namely, Arsikere in Mysore State. Because of the nonavailability of natural retting facilities and the methods of dehusking the coconuts at present in vogue in States other than Kerala, there is need for the development of the mattress and bristle fibre industry in such areas of these States where there is sufficient intensity of coconut cultivation by using power operated machinery as in Ceylon. An economic unit for a power driven fibre mill is estimated to require atleast 6,000 husks per day or 18 lakhs of husks per year, i.e., each factory will require in its proximity about 700 to 800 acres under coconut cultivation. A statement furnishing the districtwise acreage under coconut and its production is appended.

COIR INDUSTRY IN CEYLON

As stated elsewhere, the acreage under coconut cultivation in Ceylon is 1.07 million acres and the annual production about 2,147 million nuts. This acreage under coconut is confined almost entirely to the western costal area of Ceylon. The coconut is cultivated generally on estates systematically. There are two distinct lines on which the coir industry has developed in Ceylon. To the north of Colombo, a large number of power operated fibre mills have come into existence for the manufacture of mattress and bristle fibre. It is stated that there are over 300 such fibre mills in operation and these mills produce about 75,000 tons of mattress and bristle fibres, which are exported mostly to foreign countries, mainly by four large exporters in Colombo. These exporters purchase the fibres from the mills and they are sorted and graded and then baled for export in power operated baling presses.

The export of these mattress and bristle fibres during the past few years from Ceylon has been as follows :—

Year	Mattress fibre in tons	Value in Rs.	Bristle fibre in tons	Value in Rs.
1953	49,428	14,780,605	14,553	8,819,797
1954	53,809	16,296,612	15,007	9,204,813
1955	58,860	15,878,254	17,464	8,890,802
1956	52,802	15,104,176	16,018	10,277,068
1957	56,510	19,541,043	15,619	14,319,815
1958 Jan. to May	22,495	7,537,562	6,696	5,267,679

To the south of Colombo, the production of retted fibres, yarn and coir products has developed on a small scale on lines similar to those in vogue in Kerala. Here, husks are retted in backwaters or at a few places in pits dug between rows of coconut trees on the sea-shore and the production of fibre is on the usual lines. The fibre so produced is converted almost entirely into yarn and is used locally for the manufacture of coir products, the most important of these being ropes, door mattings and salt bags. It is understood that about 50 per cent of the production of coir yarn is utilised locally and the rest is exported. The following statement shows the export of coir yarn and coir products from Ceylon to foreign countries. In 1957, it is seen that Ceylon exported 1,722 tons of coir yarn, 80 tons of ropes and 10 tons of other coir products of a total value of Rs. 20,49,350.

Year	Coir yarn in tons	Value in Rs.	Ropes in tons	Value in Rs.	Mats and mat- tings in tons	Value in Rs.
1953	2,317	2,100,157	142	1,42,178	3	7,058
1954	2,621	2,237,282	101	85,913	61	25,548
1955	2,925	2,804,881	80	66,772	2	3,962
1956	2,173	2,356,689	67	52,361	2	9,702
1957	1,722	1,957,357	80	76,795	3	9,809
1958 Jan. to May	429	4,87,649	2	769	1	3,035

METHODS ADOPTED IN CEYLON FOR THE MANUFACTURE OF MATTRESS AND BRISTLE FIBRE

As observed previously, in the area lying to the north of Colombo, a number of power operated fibre mills have come into existence for the manufacture of mattress and bristle fibre. It is understood that there are over 300 such fibre mills in operation. With the exception of about half a dozen mills, these mills have installed in them only locally made machines. A typical mill will have, besides the prime-mover which may be an oil engine or an electric motor, about four or more pairs of combing drums, one or two sifters, one or more hand driven balloting presses, a masonry washing tank for the bristle fibre, a soaking tank for soaking the husk and a drying yard. The process employed in these mills is briefly as follows :

The husks, as they are received at the mills, are first put into a soaking tank and kept there for about three weeks.

The machinery is generally installed in a shed constructed on one side of the soaking tank and the soaked husks, as they are removed from the tank, are fed to the combing drums. These drums, although similar in construction, are used in pairs. The first drum is generally run at a higher speed than the second. Each drum is about 3 feet in diameter and 14 inches wide and is fixed to a horizontal shaft and driven by a belt from the main shaft. The drum consists of an iron fly wheel, to the rim of which are fixed a number of wooden planks in two layers. To the outer layer of wooden planks are fixed a number of iron nails spaced at an interval of about three-fourth inch. The nails are about $2\frac{1}{2}$ inches long, with more than half projecting outside. In front of each drum are two iron rods driven from the shaft. Soaked husks are held firmly between these rods by the operator against the revolving nails. In the first drum, the outer skins of the husk and some of the pith are removed, while in the second, the remaining pith and the smaller fibres are removed and the longer fibres remain in the hands of the operator. These longer fibres are then washed preferably in warm water in a masonry washing tank about $12' \times 5' \times 3'$ and dried in the open. After drying, these fibres are cleaned by hand and bundled for the market as bristle fibre.

A drawing showing the arrangement of these combing drums is annexed to this report. It may be mentioned that the dimensions given in this drawing are only approximate and must be taken only as a guide and it will be necessary to vary the dimensions while actually fabricating these combing drums.

The pith and the smaller fibres removed in the drums are collected and are carried to a sifter where the fibre is separated from the pith.

Sifter.—The sifter is a long conical drum about 12 to 14 feet long with a wire mesh covering on the surface, which is fixed to a horizontal shaft and rotated at a speed of about 40 r.p.m. This drum is about 4 feet in diameter at the feeding end and 7 feet in diameter at the discharging end. The fibre and pith dropped by the combing drums are fed into the sifter. While passing through the same, the pith gets separated and falls down through the wire meshes and clean fibre is discharged at the delivery end. The cleaned fibre is then dried in the open and ballotted for the market.

Balloting Press.—This consists of a horizontal wooden chamber about 10 feet in length and $3\frac{1}{2}$ feet in height with two compartments at either end. A pinion turned by a handle at the centre operates a rack horizontally within the chamber. The fibre is fed into each compartment alternatively and is pressed into bales by the movement of the rack. Each finished bale of fibre is about $24" \times 12" \times 9"$ in size and weighs approximately 12 lb.

The above is briefly the process used for the manufacture of bristle and mattress fibre in the mills. Each pair of drums can handle on the average 2,000 to 2,500 husks per day of 8 hours. One thousand husks yield on the average three-fourth hundredweight to 1 hundredweight of bristle fibre and 2 to $2\frac{1}{4}$ hundredweights of mattress fibre. The combing drums are driven at different speeds in different mills. It is stated that on the average the best results are obtained when the husk drums are run at about 400 revolutions per minute and the fibre drums at about 200 revolutions per minute. The nails on the fibre drums are made finer than the nails fixed to the husk drums. It has been intimated that each pair of drums requires only about 5 b.h.p. for operation, but in actual practice, it has been found that the horse power of the prime-mover installed is generally eight times the number of pairs of drums installed in the mills, evidently allowing for transmission, losses, etc.

In some of the larger mills, the bristle fibres are subjected to a process of hackling. For this purpose, small bundles of bristle fibre are combed by hand over a row of long iron spikes fixed vertically to a table at a distance of about three-fourth inch from each other. In the process, some of the smaller fibres get removed and the longer fibres which are retained in the hand are tied into bundles. The shorter fibre removed in this hackling process is called "Omatt" fibre. This fibre is twisted into a form of crude rope about three-fourth inch diameter. This kind of rope is stated to have considerable demand in Germany and other European countries.

DECORTICATED FIBRE

As mentioned previously, about half a dozen mills in Ceylon are understood to have installed imported equipment for the production of fibre from husks. The equipment used is that supplied by Messrs. E. W. Down & Son (Tropical, Ltd.),

Glemsford, England. The equipment consists of one husk bursting mill or disintegrator and one sifter. The disintegrator bursts open the husk and the sifter completes the opening and removes the greater part of the dust and short fibres. The fibre is discharged from the outlet of the sifter while the dust and short fibres are discharged from both the machines. The disintegrator and the sifter require two electric motors of a total capacity of 100 h.p. for driving them. It is stated that the out-turn of these machines is 1,000 husks per hour in one beating or 600 to 750 husks per hour in double beating. One thousand husks give an out-turn of about $2\frac{3}{4}$ hundredweights of fibre in this equipment. It may be observed that in this equipment, bristle fibre is not separated from the mattress fibre. The resulting fibre is stated to fetch a slightly higher price than the mattress fibre, i.e., a price of Rs. 12 per hundredweight as against the floor price of Rs. 11 per hundredweight for mattress fibre. The fibre obtained is ballotted before sending it on to the baling press.

MARKETING OF COIR FIBRE IN CEYLON

As already stated, almost all the mattress and bristle fibre, produced by the mills is exported abroad through the agency of a few large exporters who have their offices in Colombo. These exporters purchase the fibre from the mills on godown delivery basis. The bristle fibre is hackled, mostly by manual labour. In the godowns of the exporter visited by the delegation, a power operated hackling machine was found installed and working. It was however intimated that the working of this machine was not satisfactory. The shorter fibre obtained in the process of hackling is exported as Omatt fibre. The Omatt fibre is also twisted into the form of a rope about three-fourth inch in diameter, and it is stated that this twisted fibre has a growing demand in Germany and other European countries. The twisting of Omatt fibre is being carried out by hand as well as by power operated machines. It is ascertained that suitable spinning and combing machines for this twisting operation can be had from Spezialmaschinenfabrik, Dr. Ernst Fehrer, Linz Wegscheid, Austria. The bristle fibre is graded according to size and quality as one tie, two ties and three ties, depending on the number of times the fibre is hackled. The mattress fibre and, sometimes, the bristle fibre also is cleaned and baled for export in hydraulic baling presses. Modern presses for this purpose can be had from Messrs. Lindemann of Dusseldorf, Germany. These presses

are operated by 150 to 200 h.p. motors and their capacity is stated to be 40 bales of 3 hundredweights each per hour. The cost of the presses is stated to range from Rs. 6 to 10 lakhs. It is understood that low-speed presses costing less can be had from other firms.

A fair price scheme for mattress and bristle fibre is in operation in Ceylon. The current floor prices for delivery at shippers' godowns are Rs. 11 per hundredweight for mattress and Rs. 25 per hundredweight for bristle fibre. It is also understood that as a result of proposals made by the Ceylon Fibre Millers Association, an export cess of 5 cents a hundredweight on mattress fibre and 10 cents a hundredweight on bristle fibre has been imposed from 1st October 1957. The money collected from this cess is to be utilised for the development of the fibre milling industry in Ceylon.

The exporters have option to make deductions on the floor prices for mattress and bristle fibre depending on the quality, excessive moisture content, etc. On the other hand, exporters also give a premium for good quality of fibre. It is stated that decorticated fibre gets a premium of Re. 1 per hundred weight on the floor price of mattress fibre.

Shipment of mattress fibre in 1957 totalling 56,510 tons was an all-time high. The value of shipments also increased by Rs. 4.4 million to Rs. 19.5 million. United Kingdom maintained its position as the principal buyer with 43.4 per cent of all exports. Other large buyers were Germany (14.8 per cent), Australia (12.3 per cent) and South Africa (8.2 per cent).

Bristle fibre exports in 1957 totalled 15,619 tons and showed a slight decrease of about 400 tons as compared with the previous year. Despite the decrease in quantity, the value of exports increased by Rs. 4 million to Rs. 14.3 million as a result of increased prices. Japan was the largest customer with 37.7 per cent of all exports. Other large buyers were Germany (22.7 per cent), Netherlands (11.3 per cent) and the United Kingdom (8.3 per cent). It is understood that the following were the ruling C.I.F. prices to the United Kingdom at the time of the delegation's visit (August 1958):—

Mattress fibre	£ 36 to 38 per ton
Bristle fibre	£ 56 to 61 per ton
O-matt fibre	£ 50 to 52 per ton

Precise information regarding the end use of the fibres was not available with the shippers. They however opined that the mattress fibre is used for upholstery and the bristle and omatt fibres for upholstery, insulation and for making yarn and fishing nets, etc. There is also reason to believe that the omatt and other fibres are used for the production of rubberised sheets.

SUMMARY OF RECOMMENDATIONS

(1) Investigation into the average size and fibre content of the coconuts in the various States of India

One of the facts which came to the notice of the delegation was that, on the average, Ceylon millers were obtaining from 1,000 coconut husks about 2 cwts. of mattress fibre, $\frac{3}{4}$ cwt. of bristle fibre or a total of 3 cwts. of fibre which contains about 10 per cent moisture and another 10 per cent dust. In India, it has so far been considered that the yield from 1000 husks is only 180 lb. of clean soft fibre as obtained by the retting process. As far as could be judged visually, it did not appear that the Ceylon coconuts were much larger than the coconuts in India. As already stated, there is only one mattress and bristle fibre mill installed in India at Arsikere and the proprietor of that mill when questioned has intimated that he is getting on the average $2\frac{1}{4}$ cwt. of clean mattress and bristle fibre from 1,000 coconut husks in his mill. From the foregoing, it would appear that investigations have to be carried out in two directions. Firstly, it has to be ascertained whether from the same size and variety of coconut husks, the yield of mattress and bristle fibre would be more than the yield of retted fibre. It is not improbable that in the process of retting, the fibres lose more weight than in the process of manufacturing mattress and bristle fibre. It would also appear that small fibres get lost or discarded in the retting process. Secondly, investigations should be also made into the comparative sizes of Ceylon coconuts and Indian coconuts from various States and also into the fibre contents of these coconuts with a view to ascertaining the average fibre contents of Indian coconuts of various States, as ultimately the cost of production will depend on the fibre yield of the coconut husks. The members of the delegation consider that the above investigations are of prime importance and work on the same should be conducted as early as possible by the Research Department of the Coir Board. During the visit of the delegation to the Government

Coconut Research Institute at Lunuwilla, one of the Chemists in the Institute informed that he had conducted an investigation into the average weight of a Ceylon coconut and its component parts and that the average weight of an unhusked nut is 1,053 grams and that of a dehusked nut is 640 grams. The weight of husk of an average coconut in Ceylon therefore appears to be 413 grams. The same Chemist intimated that he had also carried an investigation into the size distribution of the nuts and that he has found that 95 per cent of the nuts range in diameter at the waist portion between 6 inches to 8 inches only. The delegation feel that similar investigations should be carried out in India in respect of the nuts of various States.

(2) End uses of mattress, omatt and bristle fibres in European and other foreign countries

It is well known that the coir industry is dependent mainly on foreign markets and it is therefore essential to have specific information in regard to the uses to which coir fibre and yarn are being put to in European and other foreign countries. It is of course known in a general way that coir fibre is used in upholstery, as insulation and filtering material and for spinning into yarn. The latter is evidently used for making fishing nets as well as mats and mattings. A recent development would appear to be the use of twisted and untwisted fibres in the manufacture of rubberised sheets. It may be possible to utilise a large quantity of all kinds of fibre in India itself by the introduction of suitable equipment if the end-uses of these fibres are more specifically known. For example, it may be possible to take up the manufacture of rubberised sheets if specific details regarding the sizes of sheets, process of manufacture and the purpose for which these sheets are utilised are known. In India, the yarn that is being exported is now made almost entirely from retted fibre. Owing to the high cost of production of this superior quality yarn, it may not be economically possible for this yarn to stand competition with cheaper coir yarn made out of bristle fibre and omatt fibre on power operated spinning machines, as appears to be the case in Japan and elsewhere. An investigation into the spinning equipment used and the uses to which the coir yarn made on these machines is put to should be also useful in evolving lines of development for the industry in India. It is therefore suggested that any delegation sent abroad by the Coir Board should be requested to collect information on the above points.

(3) Development of coir retting and the production of coir yarn and other products in different States

As already mentioned, the production of soft fibre by the retting process and the manufacture of coir yarn and other coir products from retted fibre has so far developed only in Kerala State, more particularly in Travancore-Cochin area. The Governments of the other coconut growing States have initiated schemes for the development of this industry in their respective areas and some progress has been made by these States, such as Andhra Pradesh and North Kanara district. The members of the delegation feel that in areas where retting facilities exist, the State Governments may intensify their efforts for the development of the above industry by the establishment of production and training centres, etc.

(4) Introduction of mattress and bristle fibre industry in the various States

In appointing this delegation, the Coir Board at its 6th meeting desired that this delegation should make an on-the-spot study of the possibility of manufacturing mattress and bristle fibre and also study the methods adopted in Ceylon for the manufacture of these fibres and examine the possibilities of applying those methods to conditions prevailing in the various States of India. In their preliminary tours in India, the delegation found that the States of Andhra Pradesh, Bombay, Madras, Mysore, Orissa and West Bengal have compact coconut growing areas with sufficient acreage to support the establishment of mattress and bristle fibre industry. Retting facilities in these areas are limited and the practice of dehusking the coconuts only some weeks after they are plucked and also leaving a part of the fibre on the coconuts to prevent damage to them in transport are not conducive to the production of good quality retted fibre. In the circumstances, these husks could be very well utilised for the production of mattress and bristle fibre. Facilities for soaking the husks are easily obtainable. The members of the delegation have made a careful study of the process employed in Ceylon for the manufacture of mattress and bristle fibre and detailed particulars of these process have been furnished in the report. The process commonly employed in Ceylon, consisting of the employment of power operated combing drums can be easily and profitably adopted in India for the production of mattress and bristle fibre. A typical small unit may consist of four or more pairs of combing drums, a sifter and an electric motor or an

oil engine to run the machines. The necessary equipment may cost approximately as follows :—

	Rs.
Four pairs of combing drums at Rs. 1,500 per pair	.. 6,000
One sifter	.. 1,500
35 b.h.p. Electric motor with switch gear, etc.	.. 7,000
One balloting press	.. 1,000
Countershaft, pulleys, etc.	.. 1,000
Well and water pump	.. 2,000
Electrification and erection charges	.. 2,500
Miscellaneous, furniture, etc.	.. 1,000
Total for equipment	.. 22,000
Land one acre	.. 2,000
One soaking pit or tank	.. 2,000
Machinery shed 40' × 25' at Rs. 10 per square foot	.. 10,000
Shed for balloting press, etc.	.. 10,000
Grand total	.. 46,000

A unit of the above type will handle about 3,000 husks per day of eight hours and assuming that at least $2\frac{1}{2}$ to $2\frac{1}{2}$ cwts. of fibre will be obtained from 1,000 husks in India as against 3 cwts. of fibre in Ceylon, the production of fibre would be 18 to 20 cwts. per day. The members of the delegation feel that it is possible to establish units of the above type in the coconut growing areas of all the States, including the hinterland of Malabar in Kerala State. In this connection, it has to be observed that in Ceylon, the price of husks is only Rs. 15—20 per 1,000 husks and the yield of fibre is as much as 3 cwts. per 1,000 husks. In States other than Kerala, husks are also available at Rs. 15—20 per 1,000 and there should be no difficulty in developing the industry from the economical point of view also. As the industry has however to be introduced for the first time, it is recommended that the Coir Board may

request the State Governments of Andhra Pradesh, Bombay, Mysore, Madras, Orissa and West Bengal to establish pilot plants in their respective States, so that the industry may get started in these areas. When these pilot plants begin working satisfactorily private industrialists will be encouraged to take up this industry.

(5) Internal and external markets for coir fibre

The development of the coir mattress and bristle fibre industry is dependent on the availability of ready marketing facilities for these fibres in the first instance in India. Later, facilities for the export of fibres should be also available. At present, the demand for mattress fibre is on the increase in India with the development of road and rail transport, establishment of more and more hospitals, etc. It is also understood that there is a market for bristle fibre in manufacturing centres such as Calcutta, Bombay, etc. The price of mattress fibre in Calcutta and Bombay is at present Rs. 25—30 per hundredweight and that of bristle fibre Rs. 50—60 per hundredweight. These prices appear to be very favorable when compared with the prices being obtained by the mills in Ceylon. In the circumstances, it is presumed that there will be no difficulty in marketing a considerable quantity of mattress and bristle fibre in India. As the industry develops, it will be necessary to build up foreign marketing contacts and also find out the end uses of these fibres in those countries, so that supplementary industries could be started in India for utilisation of these fibres, as already suggested under Recommendation No. (2). Mattress and bristle fibre manufactured in India on lines similar to those in vogue in Ceylon should be able to compete with Ceylon mattress and bristle fibre in European and other foreign markets. At present, the only export from India is of retted fibre and as this fibre is costlier than mattress and bristle fibre, India is evidently not able to increase its fibre exports under present conditions. When India is in a position to export mattress and bristle fibres to foreign countries on a large scale, it is hoped that exporters with baling presses will not be wanting to take up this business.

In conclusion, the members of the Delegation place on record their deep sense of gratitude for the facilities afforded to them in this investigation by the officers and Governments of the various States they visited and by the officers of the Commerce and Rural Industrialisation Departments of the Ceylon

Government and by Shri Gundaviya, the Indian High Commissioner in Ceylon and Shri V. C. Vijayaraghavan, First Secretary (Commercial), Indian High Commission.

(Sd.) P. K. Dewar

.. B: Narasimha Rao

.. A. Karunakara Menon

.. S. C. Roy

Ernakulam, }
19th December 1958.



सत्यमेव जयते

APPENDICES

APPENDIX I

PART I

Record of business of the delegation to study the possibilities of producing mattress and bristle fibre in India

9th November 1956

The delegation met at 3 p.m. on Friday, the 9th November 1956, on the first floor, Library Hall of the Industrial Museum at 21, Chittaranjan Avenue Calcutta-13.

The members present were :

- (1) Shri P. K. Dewar, Leader
- (2) „ N. Narayana Kurup
- (3) „ A. Karunakara Menon
- (4) „ S. C. Roy.

Shri Dewar, Leader of the delegation, presided.

2. The Leader circulated among the members copies of a detailed itinerary drawn up earlier at the instance of the delegation by Shri S. R. Sen, Deputy Director of Industries (Cottage), West Bengal, for the delegation's tour in the State of West Bengal and also a note containing useful information compiled from records in the office of the Board. The detailed programme along with this note was then considered and a modified programme was finalised.

The members dispersed at 4.15 p.m.

(Sd.)

P. K. DEWER,

Leader of the Delegation.

TOUR NOTES OF THE COIR BOARD DELEGATION TO STUDY THE POSSIBILITIES OF PRODUCING MATTRESS AND BRISTLE FIBRE

West Bengal

10th November 1956.

The delegation consisting of Sarvashri (1) P. K. Dewar, Leader, (2) N. Narayana Kurup, (3) A. Karunakara Menon and (4) S. C. Roy, visited the following factories during the forenoon :—

Messrs. W. H. Harton and Co., Ghusr, Howrah.—This is situated about 6 miles away from Chittaranjan Avenue, Calcutta. The company is a member of the Indian Rope Association, Calcutta. It is one of the six big

factories engaged in rope-making and is a leading exporter of ropes from Calcutta. Ropes made of almost all kinds of hard fibre yarns such as coir, sisal, hemp, manila, aloe, etc., are produced and they are of good quality. While sisal, hemp, manila, etc., are mostly obtained in the shape of fibre for the manufacture of ropes, coir is obtained as yarn from the West Coast. The Manager said that they do not know if coir yarn could be spun at all on the machine. The firm imports coir yarn such as Anjengo, Ashtamudi, Alapat, Beypore, etc., and also some sisal yarn from Cochin, Madras, etc. Several types of rope, measuring $\frac{1}{2}$ " to 14" in circumference are produced here. The factory can produce 8 tons of coir ropes per a day of 8 hours. About 20 per cent of the total production in the factory consist of coir ropes.

The yarn is first twisted into thicker strands—850 yards long, and then made into rope, for which separate kinds of machines are used. The coir rope is given an oil bath as a finishing touch to make it water-proof, for half to one hour. In the case of other ropes than coir, oil is sprinkled over the fibre while being spun into yarn. The output of rope has a bearing on thickness, i.e., thicker the rope the less the production. The shrinkage caused in the machine production of ropes is 20 per cent while that in manual production is about 30 per cent. But there is no production by hand here. Production through machine is generally per orders obtained previously from India and outside India.

More than 300 persons are employed in the factory and the wages range from Rs. 13 to 35 or 40 per head, a week according to the nature of the work done. The workers dealing in yarns other than coir get one or two rupees more a week. Working on a system of 8 hour shifts the company is able to provide work for their employees throughout the year.

The delegation left the company at about noon.

Accompanied by the Secretary of the Indian Rope Association, the delegation next visited Messrs. S. C. Mulick and Co., Shalimar, Howrah. This company is situated about 8 miles away from the former. The firm was started in 1869, but mechanised only about 30 years ago. There are two motors at present here of 50 and 30, u.p. while the factory was, we are told, being run by steam-engines formerly. Here also ropes are made from imported yarn. In this factory also yarn alone is manufactured. All other kinds of yarns are imported. Here the coir yarns consumed is about 10 tons a week and the rope produced is 30 cwt. in a day of 8 hours. Fifty per cent of the production of ropes in this factory is of coir. The process of making coir ropes out of yarn is the same as in the other factory, but they are twisted harder and therefore the ropes are stronger. In this factory also, ropes are finally given a bath in oil, the oil used being what they called as 'batching oil'.

About 100 persons are employed here. They work in one shift for 8 hours. We were told that last year there were two shifts. Since rope factories have been established in Malay, Singapore, Hongkong and other places, the business of this firm is gradually declining. The factories in places outside India obtain coir yarn from Cochin and they manufacture ropes themselves and this affected the rope business conducted in Calcutta. They stressed their apprehension that if the export of yarn from India was not restricted, the rope industry in Calcutta might gradually be wiped out. Forty or 45 women workers also are employed for splicing the yarn (joining together). Male workers earn about Rs.2-4-0 to 3-8-0 while women are paid

at the rate of Rs. 1-4-0 a day. Here also there is no processing of husk or spinning of fibre into yarn. The coir yarn required for the factory is entirely imported.

The delegation left the factory at about 1 p.m.

Shri B. Narasimha Rao joined the Delegation at noon.

In the afternoon the delegation visited a small doormats factory in Ultadanga Road, about 5 miles away from Chittaranjan Avenue. This factory is run by an enterprising young man by the name of Mr. Bijoy Kumar Mal (11/1 Ultadanga Road, Calcutta-4), he had learned the methods of making mats, etc., by apprenticing himself in a firm at Alleppey. He has also purchased a shearing machine (second hand) and is making fairly good mats. He purchases Travancore-Cochin yarn from the local market of Calcutta and is making mostly mats of 9" x 18" size which are being sold at Re. 1 each. The working capital of this factory comes to about Rs. 8,000.

11th November 1956.

The delegation left at 9 a.m. for Andul in Howrah district. On the way, the members of the delegation met the District Magistrate and Collector of Howrah district at his bungalow and had a talk about the object of the visit of the delegation and the state of the coir industry in West Bengal. Accompanied by the District Block Development Officer, the delegation proceeded to Andul-Mouri, where the members of the Cottage Industries Corporation received the delegation. The corporation was started in 1954 with a view to develop the coir industry. The locality is a good coconut producing area. The soil is somewhat clayish and water is not saline. There are enough husks available in this part, of which a very small portion alone is soaked for extracting fibre. Plucking of coconuts in West Bengal is carried out generally only three or four times a year. The nuts produced here are comparatively of small size. The corporation had a small training centre where coir mats, yarn, bollen string, etc., were made. For want of funds the corporation is not doing anything now. There are a few young men who had undergone training in the centre for about 8 months, but they are not doing anything now. The quality of the articles produced, considering the low standard of the coir yarn or fibre used, is not bad. The people appear to be interested in the development of the industry. The corporation has high hopes of starting a co-operative society for the manufacture of coir products.

The delegation visited some coconut godowns and markets in Andul where dry coconuts were found stored in large quantities for export to other States in India. Mature green nuts were not seen in these godowns. Coconuts are imported from places in Andhra, Madras and Kerala States. The godowns stock local coconuts also. The local nuts are comparatively very small and most of the husks are used as fuel. In de-husking, the husk is not completely peeled out. These nuts are exported to various parts in India, such as U.P., Bihar, Bengal, Lucknow, Kanpur, etc. The delegation left Andul at noon for Sankrail, an adjoining coconut growing area in Howrah district.

Reached Sankrail at 12-30 p.m. There are extensive fields, fringed with coconut trees. Coconuts are also brought here in country boats from interior parts of Bengal. Fibre of an inferior variety is being made in this area. The soaked husks are beaten with iron mallets on blocks of granite, but the

fibre is of low quality containing a lot of pith and dirt. This fibre is mainly used for making bollen strings which are commonly used in the bidi shops. This is rather a coarse variety of yarn and possibly cannot be used for any other purpose. The wages earned by the workers and the cost of fibre are also extremely low. Fibre extraction is only a part-time work for the labourer and the average wage earned is about Rs. 7 or 8 per head per month. The fibre or yarn is brought by middlemen and sold in markets generally in Calcutta. It is stated that in the neighbouring places to the east of Sankrail, there are about 1,000 people engaged in soaking, crushing, or spinning. South of Sankrail, the delegation also visited a place named Ramachandrapur. Here also people produce bollen strings or ropes out of soaked husks. Fibre of crushed husk is generally sold in large quantities at Rs. 8 a maund of 82 lb. for making mattresses. The quality of fibre is low. Akomjur is another place near Sankrail where also this industry is being carried on. The delegation returned to Calcutta at about 1-30 p.m. from Sankrail, covering about 35 miles of road in the rural parts of Howrah district.

In the afternoon, the delegation proceeded to Behala at about 2-15 p.m. There is a Government Coir Demonstration Party Centre working at Behala which is about 11 miles away from the city. This is also a fairly good coconut producing centre. Plucking of coconuts is carried on here also only thrice or four times a year. The people of the locality would appear to be not aware of the industrial utility of coconut husks. However in the Demonstration Centre training is being given in the production of yarn and ropes and in the manufacture of door-mats and matings. There is no production of these articles on all commercial basis in the cost of product is high, but the quality of the products is not bad.

A reception was arranged at the Demonstration Centre by the local Congress Committee and an address was presented to the delegation welcoming them and explaining the condition of the coir industry in the district and also emphasising the need for the development of the industry here.

Shri S. R. Sen, Deputy Director (Cottage) Industries, who was present, also spoke on the occasion.

The delegation left Behala at 5 p.m. and returned to Calcutta, covering 22 miles in the afternoon trip.

Shri M. C. Mathews arrived today and joined the delegation.

12th November 1956.

Visited the Indian Museum at about 9-30 a.m. We observed the samples of fibre and other coir products are also exhibited here. The delegation then visited the fibre and mattress markets at Chandni Chok, Hogg's market and Amratala coir market. Interviewed the Proprietor of Messrs. Ananda Charam Mallick & Co., 167-4 Dharmtallah St., Calcutta-13, one of the big mattress manufacturers in Calcutta. He said they used to get fibre from Cochin, but because of the salt particles contained therein good mattresses got spoiled on account of the reddish marks that were left behind. Local fibre costs only Rs. 8 or 9 per maund (82 lb.) whereas Cochin fibre No. 2 costs Rs. 20 to 25 and No. 1 Rs. 30 to 35. The Cochin fibre was being used only in mattresses of superior quality. He mentioned that if they could get salt-free fibre from Cochin, they would easily go in for that. We also visited the godowns and shops of several wholesale merchants dealing in

coir yarn and fibre in Amratala Street. The Cochin Central Coir Marketing Co-operative Society has also a Branch and is working successfully there. They all represented that they were at a disadvantage in one respect in the marketing of their goods, because the unregistered dealers need not pay sales-tax and can sell coir goods cheaper. Sales-tax is collected here at the last point at the rate of 9 pies per rupee. The remedy suggested by them was that the sales-tax should be collected at the first point. If so done, evasion of tax could be controlled. There is an average sale of Rs. 2 to 3 lakhs worth of coir yarn and fibre annually in the Branch of the Co-operative Society mentioned above. The coir yarn is generally used for making fishing nets, for packing purposes and for the purpose of making ropes. It is estimated that in all about Rs. 20 lakhs worth of coir products including large quantities of coir yarn imported from the West Coast, are being sold annually in these markets. These coir goods are mainly sold to retailers here. We also visited the Industrial Museum where the products of almost all the village industries including coir are exhibited. There is also a pair of spinning wheels exhibited.

The delegation covered 12 miles during today's tour. It was confined to Calcutta city only.

13th November 1956.

Shri Rao and Shri Mathews visited Messrs. Mullick and Co., in the morning as they had not arrived in Calcutta when the other members visited it on the 10th November.

We met Shri S. R. Sen, Deputy Director of Industries (Cottage), West Bengal and had a discussion with him regarding a place for our Show-room and Sales-depot proposed to be opened in Calcutta. He said that his Department had an idea of procuring a building or part of a building in Esplanade, which is a very important place in Calcutta, and that he thought he would be able to provide a room in it for our Show-room and Sales depot. It would be advisable for the Board to write to Shri Sen, immediately regarding this matter.

We held a Press Conference at 3 p.m. in Library Hall of the Industrial Museum. A note on the purpose of the visit of the delegation as well as the salient points connected with it was released to the Press. Mr. Sen was also present at the Press Conference.

The delegation had an interview with the Chief Minister of West Bengal at about 4 p.m. in the Secretariat. The Chief Minister evinced keen interest in the work of the delegation and said that while the possibilities of manufacturing bristle fibre in interior areas of West Bengal, where retting facilities are not available, should be explored, steps should also be taken to introduce coconut cultivation in Sunderbans and other coastal areas, where, he felt, there are facilities for the retting of coconut fibre. He also observed that he was asking the Secretary to Government, Industries Department, who was shortly going to Japan to bring with him any machinery available there for the manufacture of coir fibre and yarn.

Orissa State

14th November 1956.

Leaving Calcutta by the "Puri Express" at 8-30 p.m. on the 13th, the delegation reached Puri at 8-25 a.m. on the 14th. The delegation had

discussions with Shri Y. V. Rajulu, Personal Assistant to the Joint Registrar of Co-operative Societies, Orissa.

In the afternoon the delegation proceeded to Sakhigopal, situated at a distance of 14 miles, and visited the Coir Section of the Sakhigopal Narimangal Co-operative Society. Mr. Jagannath Misra, President of the Coconut Growers' Co-operative Society and member, Indian Central Coconut Committee, and Srimathi Nishamani Devi, Honorary Secretary of the Narimangal Co-operative Society, received the delegation. The Narimangal Co-operative Society is a Women's Welfare Society and has 160 members on its role within a radius of 8 miles. It was started in 1948 with the object of employing the poor women of that area in cottage industries. Some of the members are engaged in the manufacture of coir fibre, yarn, mats and matings. According to the Honorary Secretary a woman on an average earns 12 annas a day. Spinning of yarn is carried on wheels as well as by hand. Thick yarn similar to beach yarn of Alleppey but somewhat coarse is being made around this place with coir fibre extracted out of husks soaked in fresh water. Retting in fresh water is also being carried on, but the fibre extracted out of such husks does not possess the colour noticed in Travancore-Cochin. Working 8 hours, a woman makes 4 lb. of well-cleaned fibre. There is a willowing machine with the society, for cleaning fibre. This cleaned fibre is spun into thin yarn which is used for the manufacture of coir mats. For preparing 4 lb. of clean fibre out of retted husks, the society pays As. 12. The women also make yarn in small bundles, 60 feet in length each, at 5 or 6 bundles feet a day, and the society purchases this yarn at the rate of annas 2½ per bundle. Occasionally the society supplies fibre of medium quality to the Jail Department. Door-mats are generally made on frames, but there is also a loom in the possession of the society for this purpose. It is understood that there are over 130 families engaged in this industry in these villages. The society presented a memorandum to the delegation detailing their immediate requirements for the development of this industry.

The premises of the Sakhigopal Coconut Growers' Society were also visited by the delegation. The coconuts are generally de-husked leaving about 50 per cent of the husk on the nuts. These husks are mostly being used as fuel. A cart-load of husks is sold at As. 12. In the case of nuts used for local consumption, the husk is completely removed but only a very small percentage of the total nuts is thus dehusked. From discussion with the representatives of the society and the officers of the Co-operative Department, it was gathered that in Puri district about 20,000 acres of land were under coconut cultivation, that the average number of fruit-bearing trees was 40 per acre and that the average number of fruits borne by a tree was 40 per year. Thus the annual production comes to 320 lakhs. Out of the annual production of nuts, 25 per cent are exported with full husks and 50 per cent with a portion of the husk remaining on the nuts, and 25 per cent are sold locally with the husk completely removed. Of the husks that are available, about 90 per cent is used as fuel. The remaining 10 per cent is used for making yarn. It is said that from Sakhigopal Railway Station, 10 wagon-loads of coir yarn is exported annually. No fibre as such is exported from this place.

The delegation returned to Puri Circuit House at 7.30 p.m.

15th November 1956.

The delegation left the Circuit House, Puri for Bhubaneswar at 9 a.m. and reached the Circuit House at Bhubaneswar, 40 miles from Puri by 11 a.m. Shri Y.V. Rajulu, Personal Assistant to the Joint Registrar (Khadi and Village Industries), Orissa, accompanied the delegation.

The delegation met in conference Shri S. Nanda, I.A.S., Registrar of Co-operative Societies and Shri T.N. Saraf, O.A.S., Joint Registrar (Khadi and Village Industries), at 12 noon at the Circuit House, Bhubaneswar. The purpose of the delegation and the state of the industry in general were explained to the State Officers. The scheme of the Coir Board under the Second Five-Year Plan for the State of Orissa, was also discussed. The officers said that the coir industry was only in a nascent state in their State. The State has taken up the development of the industry on co-operative lines and four such societies have been established, one each at Gopalpur, Sakhi-gopal, Kalaraband and Sidhal. Besides the above, the State Government have also prepared a scheme for inclusion in the Second Five-Year Plan at a total outlay of Rs. 1,25,250. They have made a provision of Rs. 23,250 in the current year's budget for the first year of the Plan period. They have however not received the sanction of the Government of India yet and hence the work is not progressing according to plan. They suggested that the Coir Board might take up the matter with the Government of India. This source of action appears to be necessary in respect of the schemes drawn up for all the States. The State Government officers also brought to our notice that the statistics prepared regarding the production and area under cultivation of coconuts in Orissa are not accurate. In Puri district alone there is a production of about 320 lakhs nuts over an area of 20,000 acres. They also thought that Puri and a few other coastal places offered facilities for retting husks and making yarn in addition to the scope for the manufacture of mattress fibre at other centres. As regards the organisation of the industry on co-operative basis, the officers mentioned that the chief difficulty was the raising of the share-capital. Most of the workers now engaged in the industry are women and work is mostly part-time. Technical assistance is also wanted. Therefore to begin with, the co-operative societies have to be given some subsidy for putting up work-sheds and obtaining the services of expert supervisors. The officers also feel the lack of representative of the State on the Coir Board in the interest of the development of the industry in the State.

The conference terminated at about 1 p.m.

The delegation left Bhubaneswar at about 3 p.m. for Gopalpur by road and arrived at the P.W.D. Inspection Bungalow, Gopalpur, at 7.30 p.m. covering about 120 miles.

16th November 1956

The delegation visited in the morning the Coir Section of the Gopalpur Co-operative Stores.

Gopalpur is a coastal village having a substantial acreage under coconut cultivation in its vicinity. The Coir Section of the Co-operative Stores is situated adjacent to the sea-shore. There are natural facilities for retting husks in Gopalpur. The potentiality for the development of the coir industry in this centre is considerable, if the husks available are put to remunerative use by extracting fibre after taking advantage of the natural facilities.

The method followed in the extraction of fibre also requires some improvement. The Coir Section of the Society was established in 1951. The society purchases green husks at the rate of Rs. 2 per 100. The husks are retted in the adjacent backwaters in pits containing 600 or 900 husks at a time. The charges for transporting, beating and cleaning 100 husks amount to Re. 1 to 1-4-0. A woman employed in the extraction of fibre can earn about 15 annas for eight hours of work but this work is taken up generally only as a part-time subsidiary occupation. The main occupation is fishing. A "dendi" consisting of a log of wood about 4 yards in length ringed at a third of its length and operated by legs, is used for preliminary beating of the retted husks, but this process requires two people to operate and does not seem to be economical. The society has 60 members most of whom are only partially engaged in the industry. It is understood that more than 50 per cent of the inhabitants of the locality are engaged in fishing, which, as stated before, is their main means of livelihood. The number of families in the locality employed in the coir industry is about 40. The society produces yarn, ropes, door-mats, mattings, brush mats, braids and bollen string (a kind of coarse thick yarn) used in brush mats. There are a few charkhas, one carding or cleaning machine and a loom in the premises of the society. The ropes made are of fairly good quality. A cheap and simple variety of oval-shaped and coloured ($1\frac{1}{2}$ feet by 1 foot size) door-mats are made by hand. A mat of this type requires two or three hanks of yarn (each 60 feet long) and a woman working 8 hours a day produces about 10 such mats, earning approximately 10 to 12 annas daily. The production of matting is small. In making brush mats, both on frames and on the loom coarse thick yarn is used instead of fibre, and braids are used for binding the brush mats. A man is able to make about 4 mats a day and he is paid at the rate of 4 annas each. There is only one supervisor to look after the technical side of the industry for all the three co-operative societies at Gopalpur, Sakthigopal and Kalarabank. The present Supervisor underwent training in the industry for about 11 weeks at Alleppey (Muhamma) and he is paid about Rs. 50 including allowances. There is a proposal to start separate societies for the coir industry at all the centres.

The delegation also visited the retting areas of the society. There are four or five pits each being used for retting 600 to 1,000 husks. These pits are not always under water except at high tide. The fibre produced is good, but attempts should be made to improve the colour.

The Block Level Co-operative Extension Training Centre at Gopalpur was also visited by the delegation. The Centre was started last year and the second batch of students are undergoing training. Shri Dewar, the Leader of the Delegation and Shri Narasimha Rao and Mathew members, addressed the students about the coir industry.

Andhra Pradesh

17th November 1956.

The delegation left Gopalpur early in the day for Berhampur, situated at a distance of 10 miles by road, and thence to Palasa in Andhra Pradesh by rail, arriving at Palasa Railway Station at about noon. Shri B. Vasudeva Rao, Assistant Director of Industries and others received the delegation and took the members to the Travellers Bungalow at Palasa.

In the afternoon, the delegation visited the Government Coir Industrial School at Baruva, about 18 miles away from Palasa. Baruva is a village on the coastal belt of Srikakulam district where there are extensive areas under coconut cultivation. The natural facilities available justify the establishment of the coir school at Baruva. There are backwater retting facilities in the vicinity of the school, at the mouth of the river, 'Mahendathanaya'.

The origin of the school is traced to a Coir Demonstration Unit, started here in 1946 to rehabilitate the evacuees who migrated to this region. Subsequently, in 1949, the Demonstration Unit was converted into a regular training school. The sanctioned strength of the school is thirty, most of the students being drawn from poor fishermen families. Fishing and paddy cultivation are the main occupations in the area. The students of the school are given a monthly stipend of Rs. 12 each, which is proposed to be increased substantially to attract better qualified trainees. As an inducement to the trainees, a small bonus is given to them from the profits earned by the school.

Quite a variety of coir products ranging from fibre to various kinds of finished products such as ropes, chainmats, plain and inlaid mats with designs, matings, etc., are produced in the school. The school not only makes fibre of good quality but also purchases fibre from individual workers. Mature nuts are plucked in these parts once in two months. The nuts are not usually de-husked completely; one-fourth of the husk remains on the nut after peeling. This is to preserve the nuts in good condition fit for export. Local cost of such husks is only As. 8 per 100. About 12 to 15 lb of fibre is obtained from 100 husks. The cost of fibre is Rs. 1—2—0 for 5 lb. Extraction of fibre from retted husks is not new to this place and it is understood, has been in vogue for about 30 years. On an average, for a full day's work of not less than 8 hours a worker earns here only about As. 8 to 10. The fibre produced is locally sold. Besides Baruva there are other places in this area where coconuts are produced and retting facilities are available, e.g., Kusumpuram, Kavitty, etc., in Uddanam. We are told that the fibre produced at Kavitty is superior to that of Baruva.

The equipment and tools employed in the school are similar to those employed on the West Coast. There are about a dozen charkhas for making yarn, two fairly big carding machines for cleaning fibre, two looms for producing mats and matings and a few frames for making brush mats. There is need for a shearing machine for the school. The school has facilities for dyeing both fibre and yarn. The products are all of good quality and compare well with the products of Kerala but there is no production on a commercial scale at present. Besides the usual coir products, certain novel fancy articles, such as cradles, hammocks, etc., are also produced in the school. A list of prices of the various goods manufactured in the school is given below :—

Name of articles		Price			
		Rs.	A.	P.	
1.	Coir yarn (hand-made)	..	0	4	6 per lb.
2.	Do. (machine-made)—				
	Wholesale	..	49	9	9 per cwt.
	Retail	..	0	7	6 per lb.

Name of articles		Price		
		Rs.	A.	P.
3. Brush mats 2' x 1' or 22" x 14"—				
	1st quality	..	2	14
	2nd quality	..	1	6
4. Chain mats 2' x 1' or 22" x 14"		..	1	9
5. Do. 16" x 10"		..	0	12
6. Round mats		..	0	7
7. Carpet 2' x 1'—9"		..	1	9
8. Coir brooks		..	0	10
9. Coir balls		..	0	3
10. Coir rope 3"—5"—				
	Wholesale	..	54	2
	Retail	..	0	7
11. Coir matting 36" (coloured)		..	2	2
12. Do. 36" (plain)		..	2	0
Do. 30" (coloured)		..	1	13
Do. 24" "		..	1	2
Do. 18" "		..	1	1
Do. 12" "		..	0	11

The members of the delegation were much impressed with the working of the school.

The delegation visited also the retting areas in the vicinity. The method of retting as well as extraction of fibre is the same as in Kerala.

A coir factory by name "Sarvodaya Coir Factory" has also been opened by a private businessman at this place. Only coir yarn and brush mats are manufactured in the factory and the products are generally exported to Ahmedabad.

The delegation returned by about 6-30 p.m. to the T.B. at Palasa.

18th November 1956.

The members of the delegation except Shri S. C. Roy left Palasa for Nidadavole by the Howrah-Madras Mail at 7.36 a.m. arriving at Nidadavole at 6.31 p.m. The delegation further proceeded to Narsapur, about 34 miles by road, reaching Narsapur Travellers Bungalow by 11 p.m. Shri Roy returned home from Palasa.

19th November 1956.

In the morning the delegation visited Antervedi, about 8 miles away from Narsapur by boat. Antarvedi is a village on the coastal line in Razole taluk of East Godavari district, with the sea on one side and the river 'Godavari' on another. Plenty of coconuts are grown in the neighbourhood of this village, most of the nuts produced being exported to other parts in India. There are also retting facilities on the river-side as well as at the mouth of the sea. Plucking of nuts here is once in two months. Since the nuts are mostly for export, generally dehusking is done at the dry stage, a portion of the husk being left on the nut. Such husks are cheap, costing only As. 8 to 12 per cart-load containing 500 to 800 husks. Full green husks, fit for retting, in this area are scarce. But such husks are available in the surrounding villages of Amalapuram, Mayilvelulanka, etc. A coir soaking and retting centre and yarn unit, of the Government of Andhra Pradesh, is working in this

place. The centre was started about two years ago under the charge of a Coir Inspector. Retting of husks and extraction of fibre are being carried on in the centre. About 13,000 husks are now under retting in the centre. The husks are purchased locally and from the neighbouring villages, mostly from Mayilvelulanka. The cost of husks at the place of retting is about Rs. 19 per 1,000 including transport and other incidental charges, while the cost at the place where the husks are produced is only about Rs. 12-8-0 or so. The method of retting is the same as is practised on the West Coast. But in this locality soaking for a period of 15 to 30 days is more usual. There are four charkhas and a carding machine in the centre. The workers engaged in the extraction of fibre in the centre are paid at the rate of As. 10 for woman and As. 12 for man. Generally it is women that are employed in this work. A woman is able to beat about 50 to 70 husks in a day of 8 hours. About 140 lb. of clean fibre is available from 1,000 husks. Working 8 hours, about 70 lb. of fibre can be cleaned on the cleaning machine. There is no spinning of yarn in the centre at present, but it is soon to be started. The fibre produced is of fairly good quality and is all exported to the other training centres or markets such as Kakinada, Rajamundry, etc., in the State. The selling price of fibre is As. 4½ per pound. There is however no continuous work in the centre at present due to various reasons. Coir making, (i.e., extraction of fibre and the spinning of it into a sort of coarse yarn) is carried on as a subsidiary employment in these areas.

The delegation returned to Narsapur by 5 p. m.

20th November 1956.

The delegation left Narsapur for Nidadavole at about 6.30 a. m. and thence by rail to Samalkot. From Samalkot the delegation proceeded to Kakinada, about 8 miles by road.

In the afternoon the delegation visited the Coir Production-cum-Training Centre started here about a year back by the Government of Andhra. Kakinada is on the coastal belt of East Godavari district with considerable acreage under coconut cultivation in the neighbourhood. Retting facilities are available in this area. Most of the coconuts in this area are exported. Dehusking is therefore carried out only after keeping the plucked nuts for about a month. When dehusked, a portion of the husk is left on the nuts. Green full husks are not therefore available, in large quantities at present.

The centre gives training for one year to 12 students at a time. The training ranges from the retting and extraction of fibre to the manufacture of finished products, such as yarn, ropes, mats and mattings. Retting in the centre is done in lagoons only for demonstration purposes, the retting period being about 6 months. The cost of husks procured locally is about Rs. 15 per 1,000. Green full husks are also purchased from Samalkot, Amalapuram, etc., for retting. The cost of these husks varies from Rs. 17 to 20 at the place of retting. The trainees do all the work here. Almost all kinds of coir products are manufactured in the centre and the products are fairly good. The products of Baruva school are of superior quality. The cost of fibre produced in the centre is As. 4 per pound. There are half a dozen charkhas and a covered fibre-cleaning machine in the centre. About 75 lb. of fibre can be cleaned per day by using this machine. Two people are required to operate it, one to turn the wheel and the other to feed the fibre. The local

cost of labour for extraction of fibre is about As. 4 to 6 for 8 hours work. From 1,000 full husks about 140 lb. of clean fibre can be obtained.

The delegation visited the manufacturing yard of Messrs. Ripley & Co. (Private) Ltd., who are also engaged in baling and exporting coir yarn. This company tried a chemical process for extracting fibre. In this process the raw husks were first beaten and then boiled in water for 8 or 9 hours. Then a little quantity of sulphuric acid was added to the water and the husks were kept in the water for about a week. The husks were then taken out and beaten again and washed in fresh water. All kinds of husks were used for this purpose and a kind of inferior yarn was made out of this fibre. The yarn was neither strong nor attractive in colour. The colour was not fast also. This process is not fit to be recommended anywhere. Coarse variety of yarn is locally purchased by the firm for the purpose of export to the Continent. The thick variety of yarn costs Rs. 17 per hundredweight and the thin variety Rs. 20 per hundredweight. Export of these yarns amounts to 10 to 15 tons a month. Pre-war export of these goods were considerably higher, on an average it was about 30 tons per month at a cost of Rs. 9 per hundredweight

21st November 1956.

Mr. B. Gangarayudu, Chairman and Mr. G. V. Raghavulu, B.Sc. (Ag.) Secretary, of the East Godavari Market Committee, Rajamundry met the delegation in the morning and had discussions about the coconut and coir industry in Andhra. According to them 55,000 acres are under coconut cultivation in East Godavari district. This forms about 75 per cent of the total acreage in Andhra under coconuts. The total production of nuts in the district will be about 15 crores, out of which 12 crores are exported to markets in India, 2 crores are converted into copra and the remaining one crore is consumed locally. Nuts are plucked when ripe and they are generally stored for one month before de-husking. About half of the husk is left on the nut in de-husking. The nuts exported are stored from 1 to 10 months. Husks fit for retting can be expected only from the nuts used for copra and local consumption. Retting is not generally done here, but soaking for a few days in water is in vogue. However it is estimated that about 10,000 people are engaged part-time in making fibre and yarn in Razole and Amalapuram taluks of the district. The yarn made, costs 2 to 6 annas per pound depending on the quality. A coarse variety of yarn is also made by these people, the cost of which is Rs. 2-8-0 per maund. Back-water facilities for retting are available in the following places in the district :—

1. Muramalla
2. Bandamurulanka
3. Kesanapally
4. Talaravu
5. Antervedi and
6. Kakinada.

The following are the places where green husks for retting will be available :—

1. Tatipaka
2. Tekisettipalam
3. Ambajipetta

4. Amalapuram and
5. Muramalla.

Both backwater facilities and green husks are available within a radius of 8 miles from Kakinada.

The cost of coconuts is Rs. 120 per 1,000 for nuts of one month's storage and Rs. 150 for nuts of 10 months' storage, while fresh nuts cost about Rs. 105 per 1,000. On a rough calculation made, it would appear that the cost of fresh nuts together with the cost of fibre obtained from their husks would substantially be the same if not more than the higher cost obtained for nuts stored for one month or ten months after allowing for the cost of nuts wasted in storage. The wastage in storage is calculated to be 15 to 20 per thousand for one month, and 100 to 200 for ten months. A rough calculation is furnished below :—

Price of 850 good nuts obtained after 10 month's storage at Rs. 150 per 1,000	} $\frac{850 \times 150}{1,000}$ i.e., Rs. 130 (Appx.)
Cost of 1,000 raw nuts	.. Rs. 105
Fibre obtained from 1,000 husks	.. 180 lb. (Appx.) or $1\frac{1}{2}$ cwt.
Cost of fibre at Rs. 35 per cwt.	.. Rs. 50 (Appx.)
Cost of raw nuts plus cost of fibre obtained	.. Rs. 105 plus Rs. 50 i.e., Rs. 155
Labour charges for making fibre (Appx. 50 per cent of cost)	.. Rs. 25
Therefore the net amount obtained	.. Rs. 130 (Appx.)

It will be seen from the above that raw husks of coconuts now allowed to go dry can be utilised for making coir without incurring loss, if not profit, to the producers of coconuts. As it is, it is estimated that about 2 lakhs of raw husk per week will be available in the whole district at present.

The delegation also visited some backwaters adjacent to Kakinada and found that they could be used for retting.

The delegation left Kakinada for Madras at 2.21 p.m. from Cocanada Port Railway Station.

22nd November 1956.

The delegation arrived at Madras in the morning. The following members of the delegation met in the afternoon in the Railway Retiring Room here :—

1. Shri P. K. Dewar (Leader)
2. „ B. Narasimha Rao
3. „ A. Karunakara Menon
4. „ N. Narayana Kurup

The members reviewed the impressions of their tour in the States of West Bengal, Orissa and Andhra Pradesh. After discussing at length on the scope for the development of the coir industry in each of the above States, a

preliminary report containing a general summary of the observations and tentative suggestions of the delegation in respect of each of these States was drafted. It was decided that the preliminary report be submitted to the Chairman of the Coir Board.

Shri Mathews left Madras at noon today.

The meeting terminated at about 4-30 p.m.

23rd November 1956.

The delegation met again today morning and discussed the draft of the preliminary report drawn up yesterday. The draft was then adopted with certain modifications. A copy of the preliminary report as modified is appended.

The members of the delegation dispersed this afternoon and left for their respective destinations.

P. K. DEWER,

Leader of the Delegation



PART II

TOUR NOTES OF THE COIR BOARD DELEGATION TO STUDY THE POSSIBILITIES OF PRODUCING MAT- TRESS AND BRISTLE FIBRE

Bombay State

5th December 1956.

Sri P. K. Dewar, Leader of the delegation and Sri N. Narayana Kurup, Member, arrived in Bombay in the afternoon. The Assistant Registrar and the Fibre Officer, Industrial Co-operatives and Village Industries, Bombay State and Sri Prabhu, the Board's Technologist at Bombay, received the members on their arrival and took them to Hotel Majestic.

6th December 1956.

In the morning, the delegation held discussions about the details of its tour in Bombay State with the Fibre Officer and a programme was drawn up.

Sri S. C. Roy, Sri M. C. Mathews and Sri A. Karunakara Menon, Members of the delegation, arrived at noon and joined the delegation.

In the after-noon, the delegation visited Colaba military barracks where Mr. John Leo Mulvaney had arranged a preliminary demonstration of a process being developed by him for constructing partition walls by gunniting a mixture of cement and sand on a suitably suspended coir matting. As the entire process could not be completed, the Delegation returned at 5 p.m. to visit the place again the next day. About 12 miles were covered on this day.

7th December 1956.

The delegation visited the Technological laboratory of the Indian Central Cotton Committee, Matunga at 10.45 a.m. Mr Hari Rao Naukal, Director of the laboratory took the members of the delegation round the different sections and acquainted them with the work that was being carried on in these sections and particularly the work that was being carried on by the Board's Coir Technologist. Mr. Prabhu who was accompanying the delegation then explained in detail the work under progress. Samples of bleached and softened coir fibre produced by him during the course of his preliminary experiments were shown to the members. The samples were found to possess an attractive light yellow colour and were comparatively soft to the touch. The delegation returned from the laboratory at 1 p.m.

A press conference was held at 1.30 p.m. at the Majestic Hotel. Sri P. K. Dewar, leader of the delegation explained to the representatives of the Press the object of the tour of the delegation and generally the activities of the Coir Board.

At 2 p.m., the delegation proceeded to Byculla to see the manufacture of brushes carried on in that area on a cottage industry basis by a few people of the locality. Brushes were being made mostly out of palmyra fibre. Coir fibre also was being used to a small extent. The manufacturers complained that the coir fibre they were getting was of low quality and was not good enough for brushes. Hence they were using palmyra fibre. The delegation also wished to visit a factory making brushes on a large scale but the officer accompanying the delegation was not aware of any such factory at all.

The delegation proceeded at 3 p.m. to the military barracks at Colaba to see the final stage of the 'Mulvan' process. In this process, coir matting is hung from the top of a wooden frame (15' x 6'). Thin rods are introduced through the matting vertically at about 1 foot intervals. The matting is tied at different points along its sides to the wooden supports of the frame. The matting is first wetted by spraying water. A mixture of cement and sand in the ratio of 1 : 3 is then sprayed on the the matting by a cement gun. Some of the concrete had to be wasted as it could not hold on on the matting until the pores of the matting got filled up. However it was said that much of the waste could be avoided by using mattings of closer mesh and applying the concrete by hand operated spray pumps. The matting is sprayed on both the sides to the required thickness, varying normally between 1 inch to 3 inch. During the process, the matting extends due to the weight of the concrete and is finally cemented to the ground. The delegation was told that this method of construction effected a saving in costs of approximately 15 per cent compared to brick or R.C.C. work and that these walls were as strong as brick walls. It was also said that these walls would be sound-proof and were not liable to crack under any circumstances. The delegation is not in a position to express a definite opinion on the advantages or the advisability of such constructions. They are only in a stage of experimentation. Mr. Mulvaney is a consulting architect. The delegation covered in all about 38 miles during the day and returned to their residences at 5.30 p.m.

8th December 1956.

The delegation left Bombay at 8 a.m. today by steamer for Dhabol and thence proceeded to Guhagan by road, arriving at the District Bunglow at

Guhagar at 8-30 p.m. after covering about 110 miles by road and water. The Fibre Officer, Bombay accompanied the delegation.

9th December 1956.

In the morning, accompanied by the Fibre Officer, Bombay and the District Officer, Industrial Co-operative and Village Industries Department, the Delegation visited a retting place near a causeway and the Government Coir Works School and Production Centre. The Delegation also met the one Mr. S. C. Arekar, President of the Taluka Congress Committee and the Chairman of the Guhagar Audyogik Sahakari Society, Ltd., at Guhagar.

Guhagar is the Headquarters of Guhagar Taluk in Ratnagiri, which is a Coastal District of the Bombay State. The taluk is about 240 sq. miles in area and has a population of about 87,000. The area under coconut cultivation is approximately 380 acres in the whole taluk, of which 135 acres are in Guhagar Village. The population of this village is about 5,000. The total production of coconuts in the whole taluk is estimated to be nearly 14 lakhs, calculating at the rate of 45 nuts per tree and 80 trees on an average per acre. Nuts are plucked once in two months but generally there is no immediate dehusking. More than 50 per cent of the nuts are exported and the rest are consumed locally. The latter are dehusked immediately after plucking, according to the local demand.

The Delegation was taken to a causeway, where a negligible quantity of husks was being retted by some people of the locality. The retted husks are utilised for making a very coarse variety of thick yarn. The production of yarn is only for domestic consumption, such as for tying, thatching, fishing, etc. Some ropes are also made out of yarn purchased from outside. On the whole, the industry is in a very nascent state in this part of the State.

The Coir School was started here in 1952 by the Government of Bombay. The school is soon to be shifted to Basani, another place in Ratnagiri District. It is not working now also. The school was originally started to give training to displaced tappers in retting, extraction of fibre, spinning of coir yarn and manufacture of coir products such as mats and matting, etc. All the fibre required was got down from outside, generally from Vengurla Taluk. The cost of fibre including transport charges was high. The course of training was for one year for 12 students at a time. A stipend of Rs. 15 each was given per mensem. About 44 people have been trained in 4 batches but none of them has taken to this industry after the training. There is not much of enthusiasm among the people to develop this industry in this locality.

The delegation had also a talk with the District Officer of the place. We were told that there were retting facilities in Vengurla and Shiroda Taluks in Ratnagiri District. Some merchants in those parts purchased coconut husks from growers for retting in the backwaters there and extracting fibre through hired labour. They also made some yarn on rats and ropes for fishermen. The yarn produced is generally used for packing mangoes and the ropes for fishing purposes.

The Government of Bombay are running coir schools, one at Mulwan in Mulwan Taluk and another at Kelshi in Depoli Taluk, besides the one at Guhagar. The school at Mulwan is about 3 years old and that at Kelshi is started only recently. These schools purchase fibre from the merchants

engaged in the industry in Vengurla and Shiroda taluks and manufacture coir articles. The cost of fibre in those places is reported to be Rs. 8-8-0 per maund of 28 lb. All the articles made in the schools are sold in the localities themselves. The monthly production of goods at the Mulwan school will be of about Rs. 1,500 value.

The delegation left for Bombay from Guhagar, via., Dabol at 4-30 p.m.,

10th December 1956.

The delegation arrived at Bombay at 7-30 a.m. and left by rail for Poona.

At Poona, the delegation met Sri V. Subramanyam, I.A.S., Joint Registrar of Industrial Co-operatives and Village Industries, Bombay State and discussed with him about the possibilities of manufacturing mattress and bristle fibre in the State.

The delegation left Poona at 7-30 p.m. for Hubli by rail.

Mysore State

11th December 1956.

The delegation arrived at Hubli from Poona at 9-50 a.m. The special Deputy Registrar, Belgaum, the Assistant Registrar, Dharwar and the District Officer of Industrial Co-operatives and Village Industries, Hubli, received the members of the delegation. The delegation had a talk with the officers and drew up a programme for the North Kanara District.

The delegation left Hubli at 2 p.m. and reached Honavar at 10 a.m. covering about 115 miles by road and halted at the District Bungalow.

12th December 1956.

The members of the delegation visited at 8-30 a.m. the Government Coir Factory-cum-Training Institute at Honavar. The Centre was started by the then Government of Bombay in 1952 to give training in the manufacture of coir and coir products. The course of training is for one year and 15 students, men and women, are admitted at a time. The trainees are given a monthly stipend of Rs. 20 each. Thirty-six students have been trained so far. These students after training are absorbed as far as possible in the factory section which produces coir goods on a modest commercial scale.

The institution is equipped with a warping drum, a few spinning wheels a few brush-mat frames, five mat-weaving looms and two rope-making units, etc.

The centre produces coir products such as, yarn, mat and mattings including cricket mats, door-mats, floor covering of various designs, ropes and some other articles of local demand. Fibre required for the manufacture of articles in the institute is purchased locally to the extent available and is supplemented by fibre obtained through merchants in Bombay. The cost of local fibre is As. 3 per pound while that of fibre obtained from Bombay is about As. 5 per pound. The institute used to purchase coir yarn also locally, the cost being about Rs. 16 per maund of 28 lb. whereas the yarn produced in the Institute costs only Rs. 14 per maund. Generally the price of articles produced in the centre are fixed on the basis of the actual cost of production.

of the articles, plus 15 per cent profit to cover the establishment charges, etc. With a production and sale of Rs 240 worth of goods a month, this 15 per cent margin would normally cover the establishment charges. On an average the production of the centre is goods worth Rs. 1,800 per mensem. Figures of production and sale of goods as seen from a note given by the District Officer for Industrial Co-operatives, and Village Industries, Karwar, are given below :—

	<i>Production (Cost)</i>	<i>Sales (Value)</i>
	<i>Rs.</i>	<i>Rs.</i>
1952-53	5,222	2,758
1953-54	8,210	13,673
1954-55	15,066	16,565
1955-56	19,905	31,895

Besides the trainees there are about 20 labourers working in the factory. Payment is on piece-rate basis. On an average a male labourer is able to earn Rs. 1-8-0 and a woman labourer about 10 annas per day.

Marketing is a problem for the centre at present, apart from the difficulty in getting enough husks and fibre. It is reported that goods worth about Rs. 13,000 are lying accumulated in the factory.

The factory proposes to start retting of husks by itself and to give training to employees in the extraction of fibre and thus produce fibre required for the purposes of the factory.

The working of the institution is primarily guided by a Local Advisory Committee and the delegation met the Committee which consisted of five members—Mr. R. N. Kamath, M.L.A., is the Chairman of the Committee. It is understood that there are about 12,000 acres of land under coconut plantation in the North Kanara District and the total production of nuts will approximately be 240 lakhs calculating at the rate of 50 nuts per tree and 40 trees per acre. Of the total acreage of coconut plantation in the North Kanara District about 5,000 acres are in Honavar Taluk. Almost all the coconut plantations are on the coastal belt. According to the estimate furnished by the District Officer, Karwar the total production of fibre in the whole District is only 4,000 cwt. at present which would form only 6 per cent of the productive capacity of the District. It is reported that Honavar is the most potential centre in North Kanara District as far as coir industry is concerned. It is stated that there are good retting facilities also in the taluk.

Plucking of nuts is done once in two months, but the nuts are not de-husked immediately after plucking. Above 50 per cent of the nuts are exported and the rest are consumed locally. There is no oil industry in the locality at present. Therefore the nuts are generally allowed to go dry so that they may be sold when the price is high. At the most, only 20 per cent of the husks will be available in the green state, fit for retting. No dry husk is utilised for producing fibre. There are about 1,000 families in the locality engaged in the production of fibre and yarn. Yarn is made both by hand and with the aid of spinning wheels. On an average a person working in leisure hours produces about 3 to 3½ lb. of yarn on wheels and the price obtained is about As. 2 per lb. Yarn produced locally has usually a ready market. The method of preparing mattress and bristle fibre is unknown to the area. A co-operative society consisting of about 75 per cent of the people trained

so far has been organised here. The society is at present engaged in the production of coir yarn.

The delegation then visited the Coir extraction and Spinning Institution at Bende-halla. This institution is part of the Government's scheme to develop the coir industry. There are three such institutions in the District, two are in the Honavar Taluk and one in Kumta Taluk. The institution is intended to train people in the extraction of coir fibre and spinning of fibre into yarn. The duration of the course is three months. The trainees are given stipends at the rate of As. 8 per working day. Twenty students are admitted at a time. The average production of yarn per spinning wheel is 5 lb. per day.

The delegation also visited a retting place nearby. The method of retting is the same as is practised on the West Coast.

In the afternoon, the delegation left for Kumta where the members of the delegation visited the Coir Manufacturing School run by the Government. This is a peripatetic school imparting training in the manufacture of yarn, mattings, brush-mats, ropes, etc. Some fancy articles are also being produced. The course is for one year and 12 students are admitted at a time. The trainees are given stipends at the rate of Rs. 20 each per mensem.

The products of the school are fairly good. The average monthly production is of the value of about Rs. 375. Almost all the production is locally sold.

In Kumta there are about 3,000 acres of land under coconut cultivation. There are also retting facilities. The conditions obtaining in Kumta are more or less the same as in Honavar. But practically there is no production of fibre in Kumta. The fibre required by the school here is purchased from Honavar. The price of raw husks at Kumta is Rs. 15 per 1,000. The fibre obtained from Honavar costs Rs. 32 per cwt. The industry was started in Kumta only recently. The earning of labour employed in the industry at Kumta is As. 12 to Re. 1 per head.

The delegation met the Local Advisory Committee of the school. The Committee consists of five members, Shri R. B. Naik, M.L.A., being the Chairman. They discussed the state of the industry as well as the scope for the development of the industry in the locality. There is a co-operative society organised recently for the promotion of the industry. The trainees are enrolled as members and are given assistance to take to this industry after their training. There are about 170 members at present.

The delegation left Kumta by road at about 2 p.m. and reached Hubli at 10 p.m. The distance covered during the day is 120 miles.

13th December 1956.

The delegation left Hubli by rail in the early hour of the day and arrived at Arsikere in the noon. Shri B. Narasimha Rao who arrived here the previous afternoon from Hyderabad via Bangalore joined the Delegation.

The members of the delegation inspected the Coir Yarn Textiles at Arsikere owned by one Mr. M. S. Hanumantha Rao. It is understood that this gentleman has been devoting his time to the development of the coir fibre industry since 1939. It is said that he first tried retting husks in fresh water in Karesantesamudram tank situated at a distance of about 15 miles from Arsikere, but incurred loss as the tank got dried up. Subsequently he installed

a factory at Arsikere in 1949 for the manufacture of coir fibre using power-operated machinery.

At present the following are the equipments installed in the factory :—

(1) *One power-operated Crusher.*—This consists of two fluted rollers each about 9 inches in diameter and 18 inches long. The distance between the rollers can be adjusted. This is intended to crush the husks before they are soaked.

(2) *One masonry soaking tank.*—This is built above the ground and is about 1,200 square feet in area and 6 feet deep. This is supplied with water from a well by means of an electrically operated pump.

(3) *Two power-operated Openers.*—These machines are intended to remove the outer skin or the epicarp of the husk and also most of the pith from the fibre. Each machine consists essentially of a big fly-wheel about 3 feet in diameter and 1 foot wide. On the periphery of the fly-wheel to a width of 9 inches are fixed spikes at a spacing of about three-fourth inch. The spikes are $2\frac{1}{2}$ inches in length of which $1\frac{1}{2}$ inches is projecting outside the periphery wheel. The top of the wheel is enclosed in an iron casing. These machines are run approximately at a speed of 300 r.p.m. The soaked husks are held in the hands and subjected to a teasing action by the revolving spikes on the periphery of the wheels and this action removes the epicarp and the pith. After one half of each husk is subjected to this action, it is turned and the other half is subjected to the same action.

(4) *Two Dressers.*—These machines are intended to remove the remaining part of the pith from the fibre and to separate the mattress fibre from the longer bristle fibre. The machines are similar to the 'openers' in all respects excepting that they are run at a lower speed of about 150 r.p.m. The husks are held in the hands and subjected to the action of the spikes as in the 'openers'. The longer bristle fibres remain in the hand while the shorter mattress fibres and the pith are thrown below the machine.

(5) *One power-driven Sifter or Screen.*—This machine consists essentially of a tapering drum mounted horizontally and having an expanded wire screen on the outside. It is about 10 feet in length, the feeding end being about $3\frac{1}{2}$ feet in diameter and the other end about $5\frac{1}{2}$ feet in diameter. The shorter fibres which are thrown out by the openers and dressers are fed into this revolving drum. While the fibres travel slowly from one end to the other, the pith is thrown out and clean and partly dry fibre is discharged at the wider end.

(6) *One Baling Press.*—This is hand-operated. This is intended to make bales of mattress fibre weighing 10 lb. each.

All the power-operated machines mentioned above are housed in a building $45' \times 22'$. The proprietor of the factory said that the price of husks varied considerably from time to time but may be put at Rs. 6 per thousand husks on an average. The fibre obtained from 1,000 whole husks is estimated to be 6 maunds, i.e., 168 lb., each maund being calculated at 28 lb. He also said that the fibre produced in the factory is sold at Rs. 60 per hundredweight for bristle fibre and Rs. 20 per hundredweight for mattress fibre. He was supplying bristle fibre to Messrs. The National Brush Manufacturing Co., Bombay, to the tune of 300 to 400 hundredweight yearly, some quantity of bristle fibre was being supplied to one Mr. N. Y. Sadayappa Chettyar, Mannady Street, Madras, also. The process adopted in this

factory for separating the bristle fibre from the mattress fibre mainly consists in separating the longer fibres from the shorter ones and it is observed that the bristle fibres contain a percentage of soft fibres also. The proprietor deserves credit for the equipment he has improvised for this industry.

Shri K. Sidde Gowda, Superintendent, Rural Industrialisation Scheme, Hassan District, who received the delegation gave us a note on the development of the coir industry in the State. He has stated that the area under coconut cultivation in the old Mysore State was about 1,75,000 acres according to the Revenue accounts and that according to the survey operations that are being undertaken at present the acreage is likely to be about 2 lakhs of acres. The total acreage of coconut cultivation including the areas of North and South Kanara Districts which have now been added on to the Mysore State will come to be about 2½ lakhs of acres. The coconut cultivation is concentrated in the Taluks of Tiptur, Chikkanayakanarally and Turuvekere of Tumkur District; Channarayapatna and Arsikere Taluks of Hassan District; Chamarajanagar, Nanjangud and Yelandue Taluks of Mysore district; Kadur Taluk in Chikkamagalur District; Hosadurga and Hiriyr Taluks in Chitaldurga District; Channapatna, Ramanagara and Kanalpura Taluks of Bangalore Districts; Maddur, Malavally, Nagamangala and Krishnarajpet taluks of Mandya Districts. Tumkur District has nearly 70,000 acres under coconut cultivation and the Hassan District about 50,000 acres.

On an average there will be 40 trees per acre and 50 nuts per tree. The total nuts per annum will be more than 40 crores.

Percentage of copra to nuts.—About 12 crores or 30 per cent. of nuts are converted into copra or dried nuts.

The method is to store the nuts for 9 to 12 months in houses and then the kernel or copra is removed from the shell.

The value of 1,000 nuts will be Rs. 150 to 160; their copra is valued Rs. 200 to 210.

Shri Sidde Gowda also stated that experiments were being conducted in some areas by using the irrigation water for the purpose of retting husks. The results of the experiment are being awaited.

The delegation also met Shri Bhimappa Naik, the Minister for Co-operation, Government of Mysore, who happened to be camping at Arsikere at the time and discussed with him the desirability of developing the mattress and bristle fibre industry in the Mysore State. The pioneering efforts made by Mr. Hanumantha Rao in this direction were brought to his notice so that suitable financial assistance may be given to him for developing the industry.

The delegation left Arsikere and arrived at Mysore in the evening.

14th December 1956.

The delegation visited Nanjangud, Calale and surrounding villages in the morning. Husks are being retted in fresh water in this area. It was stated that at Kalale 1,500 husks on an average were being used daily for the extraction of fibre. The daily production of fibre would be about 10 maunds, i.e., 240 lb. About 300 peoples were engaged in the industry at the place. The fibre produced in these villages is purchased by the Government Coir factory at Nanjangud. The fibre as made in these villages is not of good colour. On an average about 60 maunds of fibre are purchased by the centre at Nanjangud.

per mensem, i.e., 2 maunds per day. The remaining fibre produced at Kalale and other villages was being sold to merchants at Mysore. The present rate at which the Nanjangud factory purchases fibre is Rs. 4 per a maund of 24 lb. When the fibre is cleaned on willowing machines, there is a loss of 40 per cent in weight due to the removal of pith, etc. The cost of willowing is 6 to 7 pies per pound of cleaned fibre.

There are at present 9 trainees in the Nanjangud factory. The wages paid to the trainees are according to their capacities and range from 7 annas to 14 annas. Coir yarn and ropes are the main articles produced in the factory. It is said that some other articles will also be produced according to the orders received from the Government Departments. The cost of one pound of clean fibre comes to 6 annas and the cost of one pound of yarn to 8 annas. It is said that yarn is being sold at the rate of As. 9 per pound. The factory has been in existence for about ten years and it has imparted training to several batches of trainees. But apart from the production of fibre, other activities such as the production of coir yarn and other coir goods have not yet been taken root in the area.

The delegation returned to Mysore at about 12-30 p.m. The distance covered by road in the morning was 40 miles.

In the evening, the delegation left Mysore at 3 p.m. by road and reached Bangalore at about 6 p.m.

15th December 1956.

In the absence of Shri B. Beerappa, Director of Rural Industries, Mysore members of the delegation met Shri Venkatachar, Deputy Director and had a discussion with him about the development of the coir industry in the State. Shri Venkatachar promised to convey to the Director the purport of the discussion that took place between the delegation and him.

The delegation left Bangalore for Trichinopoly by rail at 6-25 p.m.

Madras State

16th December 1956

The delegation arrived at Trichinopoly at 8-30 a.m. The Assistant Director of Industries and Commerce, Trichinopoly received the members on their arrival and took them to the P.W.D. Inspection Bungalow.

The delegation visited Ayyampalayam, a village in Musiri Taluk, Trichinopoly District, where there are extensive areas under coconut plantation. A few families were found retting husks in flowing and stagnant water in the area. The fibre produced is of dark colour. Retting period varied considerably from weeks to months. The longer the period of retting the darker is the colour of the fibre obtained. It was also observed that the people of the locality were adopting a bleaching process to get a better colour for the fibre produced. Water in which tamarind flower is soaked is sprinkled over the fibre, which is then dried in the sun. The fibre then obtains a better colour. But we learnt that the colour so obtained was not long-standing and would fade if the fibre was washed in water.

A kind of three-ply coir ropes is also produced by the people of the locality. The spinning wheels used here are different from those in vogue in

other places. Each wheel consists essentially of an iron gear wheel $1\frac{1}{2}$ feet diameter revolving in a wooden frame fixed on the ground. This wheel imparts motion to four small spur wheels fixed on the wooden frame. The method of operation is the same as in other places. The cost of the machine is said to vary from Rs. 25 to Rs. 60 or 70 according to the size.

The cocoons are plucked once in three months in this area and generally husk is not completely removed in de-husking. About half of the husk is left on the nuts. The cost of such husks is Rs. 2-8-0 to Rs. 3 per 1,000. Out of 1,500 husks, 10 three-ply ropes, 10 to 15 feet each, are produced. The price of such coir ropes is annas 5 to 6 each according to length. A person engaged in making such ropes will be able to get about Rs. 2 per day including the cost of husk and labour. The wage for extraction of fibre is As. 8 per day per head. There are only about 10 families engaged in this industry in the locality at present.

The members also visited Sundaikkai, Thailampalaya, Thotiyam and Chipleputhur in Kattuputhur Taluk. The conditions obtaining in all these villages are the same excepting that there are slight variations in the cost of husk, all ranging from Rs. 2-8-0 to Rs. 5 per 1,000. The methods of retting husks, extraction of fibre and making yarn and ropes are all the same. In all these villages together, there are about 20 families engaged in the industry.

The delegation covered about 98 miles in all by road in today's trip and returned to the P.W.D. Inspection Bungalow at 8 p.m..

17th December 1956.

Members of the delegation left Trichinopoly by rail and arrived a Tanjore at 8.43 a.m. The Assistant Director of Industries and Commerce, Tanjore received the delegation.

The delegation met at the Office of the Assistant Director, one Mr. A. A. Rahiman, a coconut merchant of the locality and one Mr. V. S. Subramania Iyer, a Mirasdar. From the talk the delegation had with them, it is understood that in the District of Tanjore not less than 10 crores of coconuts are produced. Half of these nuts are dehusked at the green stage and the remainder after being dried. Mr. Rahiman has just started the production of coir fibre and ropes, etc. He soaks husks in fresh water for a week after being crushed. The husks are then taken out and fibre is extracted. The cost of 1,000 husks is Rs. 5 in the area. Out of 200 husks about 25 lb. of fibre are obtained. The cost of production of 25 lb. of fibre is Rs. 4 and the cost of production of coir yarn is As. 5 per pound.

The Mirasdar represented that there were plenty of green husks available in his area and also labour. Therefore he is interested in making use of the available husks and wanted to be advised as to how he should organise the industry.

The delegation then proceeded to Rajamadham, a coastal village in Tanjore District where there are plenty of coconut trees. Despite the proximity of the sea there are no backwater facilities here for retting husks. We learnt from the Assistant Director of Industries and Commerce who was accompanying the delegation that the Government of Madras are starting a number of training-cum-production centres for the development of the coir industry in the State. One of such centres has already been sanctioned by

the Government to be opened in the Vedaranyam Block and it is proposed to be opened very shortly at Theputhurai.

The delegation visited Adirampatnam where coir, fibre and ropes are manufactured on a small scale. They obtained yarn from Malabar (Feroke Yarn) and from Quilon. Soaking husks in fresh water and extracting of fibre are being carried on in the locality on a very small scale. Husks are first beaten and then soaked only for one day in fresh water for extraction of fibre. A kind of very coarse variety of yarn is made out of this fibre. The method of spinning yarn is rather crude. The cost of this yarn is about As. $2\frac{1}{2}$ per pound. It is understood that there are about 20 or 25 families in the area engaged in the industry.

The delegation returned to Tanjore at about 5 p.m. by road covering about 80 miles in the trip and thence to Trichinopoly by rail.

18th December 1956.

The delegation left Trichinopoly by rail at 4.5 a.m. for Tenkasi reaching Tenkasi at 12.43 p.m. The Assistant Director of Industries and Commerce, Tirunelveli received the members and took them to the P.W.D. Inspection Bungalow.

In the afternoon, the delegation visited the local coconut growing areas. Though there are coconut husks available in the locality, the coir industry does not at present exist here. It is understood that the husks produced in this area are being sold to merchants who send them to Kerala. The cost of husks is Rs. 10 per 1,000. The merchants collect the husks in lorry, the cost for hiring the lorry being Rs. 6 each. De-husking of coconuts in this area is carried out only when there is a demand for nuts. Unlike in other districts, in Tirunelveli whole husks are removed in the de-husking of nuts. There are no back water facilities here for retting.

Members of the delegation met at 7.30 p.m. and reviewed the impressions they had formed about the coir industry in the States of Bombay, Mysore and Madras, for drawing up the report regarding the same.

19th December 1956.

The delegation met at 7 a.m. today and held further discussions about their impressions of the tour in each State. After examining the facts from the records available, a draft of the report in respect of Bombay, Mysore and Madras States was drawn up.

At 2 p.m. some of the members of the delegation proceeded to Tiruchandur, about 18 miles away from Tenkasi, and visited the coconut plantations in the area. The members further proceeded to Kulasekharapuram which is said to be a former port, and also to Malapuram. These places are on the sea coast. At Malapuram sea water flows into a creek. It is about 2 miles long and a furlong broad. The creek never dries up but sea water flows in only once in a month, i.e., during the full-moon days the water which is collected on such an occasion about 2 to 3 feet deep remains there stagnant until the next full moon when it is received.

The total area under coconut cultivation in and around the coastal belt, about 6 or 7 villages in all, is approximately 1,400 acres. The coconuts produced in these areas are generally exported to Ramnad District in green condition. Nobody has however so far tried the coir industry in the area.

The members of the delegation returned to Tenkasi at about 10 p.m. covering a distance of about 160 miles in all by road during the day.

20th December 1956.

The delegation met in the morning and finalised the preliminary report drawn up yesterday. A copy of the preliminary report as adopted is appended.

Members of the delegation then dispersed from Tenkasi for their respective destination.

(Sd.)

P. K. DEWER,

Leader of the Delegation,

Camp: Tenkasi,

20th December 1956.

APPENDIX II

PRELIMINARY REPORT OF THE DELEGATION APPOINTED TO STUDY THE POSSIBILITIES OF PRODUCING MATTRESS AND BRISTLE FIBRE IN INDIA

PART I

The Coir Board at its meeting held on the 25th February 1956 appointed a delegation consisting of six members to investigate the possibilities of manufacturing mattress and bristle fibre in India. According to the resolution, the delegation has to make a study of the following aspects of the problem :—

- (1) to make an on-the-spot study of the possibilities of manufacturing mattress and bristle fibre in India ;
- (2) to study the methods adopted in Ceylon for the manufacture of mattress and bristle fibre ; and
- (3) to examine the possibilities of applying the above methods to areas in India where there are no retting facilities.

In the preliminary tour undertaken by the delegation in the States of West Bengal, Orissa and Andhra, the delegation mainly applied its mind to the matter coming under item (1) mentioned above. The Chairman of the Coir Board, during the course of the discussions at the meeting of the delegation held on the 25th September 1956, suggested that the delegation should also take the opportunity to study other relevant problems connected with the coir industry to the extent possible and this was also attended to by the delegation. Detailed notes on the work done each day are appended. A General summary of the observations and tentative suggestions of the delegation in respect of each of the States is furnished below :

West Bengal

The delegation, from its tour of the coconut-growing areas round about Andul, Sankrail, Behala, etc., and its discussions with the Chief Minister of the State, the officers of the Industries Department and other interested parties, is of opinion that coconut cultivation in West Bengal is at present largely confined to areas where there are no regular backwater facilities. As such, the scope for the development of the coir yarn industry is limited. However within the limitation mentioned above, the Government of Bengal is trying to popularise the manufacture of coir yarn, mats, mattings and other coir products. There are a large number of fresh water tanks and pits which can be made use of for soaking husks and converting them into mattress and bristle fibres. At present, a limited quantity of mattress fibre of an extremely coarse and low quality is being made by private individuals for the market in Calcutta. There appears to be considerable scope for improving the quality of the mattress fibre and also expanding this industry. Calcutta and the adjoining portions of Bengal are industrially developed and there also appears to be considerable scope for developing the market in bristle fibre. The delegation therefore feels that there is scope to develop the mattress and bristle fibre industry in West Bengal. The Chief Minister while evincing keen interest in the work of the delegation, gave the members to understand that there was scope for developing coconut-cultivation in coastal areas such as Sunderbans, etc., where retting facilities are available and that there is thus scope for developing the coir yarn industry also in West Bengal. This however is a matter that would take time.

Mention has also to be made of the fact that in and around Calcutta, a large mechanised industry has developed in the manufacture of coir ropes, utilising yarn imported from the West Coast.

Orissa

In Orissa coconut-cultivation is confined more or less to particular areas such as to parts of Puri and Ganjam districts. The delegation covered most of the coconut-growing areas visiting Puri, Sakhigopal, Bhubaneswar and Gopalpur. Fairly good retting facilities are available in areas adjoining the Chilkalake and in and around Gopalpur, the latter being by far the best. The Orissa Government are trying to develop the manufacture of coir yarn and other coir products by establishing co-operative societies for the purpose. The delegation considers that retting and manufacture of coir yarn should be encouraged in those areas where retting facilities are available. The manufacture of mattress and bristle fibre may be attempted in other places such as Sakhigopal where coconut and fresh water for soaking are available.

Andhra Pradesh

A considerable part of the coconut-growing areas of Andhra State was covered by the delegation. It visited Baruva in Srikakulam District, Antervedi and Kakinada in East Godavari District and Narsapur in West Godavari District and also toured the adjoining coconut-growing areas. It is observed that good retting facilities exist on the coastal belt, particularly in Srikakulam and East Godavari districts. The Andhra Government have already started schools and centres for developing the coir industry in these areas and judging by the standard so far attained, the delegation feels that there is considerable scope for developing the coir industry in these coastal areas. There is however the difficulty that in Andhra as in Orissa and West Bengal States, the

coconuts are not de-husked until after a month of their plucking and even then, the nuts are not completely de-husked, thus making available only about 50 per cent of the husks for industrial use. The successful development of the coir yarn industry is therefore dependent on a gradual change being brought about in the existing practices mentioned above. There is however immediate scope for developing the mattress and bristle fibre industry making use of the husks as at present available both in the coastal areas as well as in the interior areas. Considering the large acreage under coconut cultivation (92,200 acres) in Andhra, the delegation considers that there is scope for the development of the mattress and bristle fibre industry in the State in addition to the development of the coir yarn industry on the coast.

A further report will be submitted by the delegation after its tour in the other States.

PART II

Since the submission of the report on its tour in West Bengal, Orissa and Andhra States, the delegation has now completed its tour in the States of Bombay, Mysore and Madras. Detailed notes on the work done each day are appended. The following is a general summary of the observations and tentative suggestions of the delegation in respect of each of the States of Bombay, Mysore and Madras.

Bombay State

Before the States reorganisation came into effect, the Bombay State had about 30,000 acres under coconut cultivation. With the transfer of the North Kanara District to Mysore, the acreage under coconut cultivation in the Bombay State has come down to about 16,000 acres. From discussions held with the officers of the Bombay Government, it is understood that the above acreage is confined largely to the coastal districts of Colaba and Ratnagiri. These two districts possess some natural facilities for coir retting but not on an extensive scale and the Government of Bombay are trying to develop the production of coir fibre, yarn and other articles by establishing schools and training centres at places such as Guhagar, Vengurla, Arunda, Mulwan and Kealshi. It cannot be said that the industry has so far made any appreciable progress in the State. Apart from the limited acreage under coconut cultivation in the State, the practice of storing the coconuts for seasoning before de-husking and leaving about 50 per cent of the husk on the coconuts militates against the development of the coir retting industry. Even so, it might be possible to develop this industry at places having suitable facilities to a considerably larger extent than at present. It should also be possible to develop at proper centres in this area the production of mattress and bristle fibre, particularly as Bombay City offers excellent marketing facilities for these fibres in the brush and mattress making industries.

Mysore State

Before the States reorganisation, Mysore State had about 1,70,000 acres under coconut cultivation. After the States reorganisation and the addition of North Kanara from the Bombay State and most of South Kanara from the

Madras State, which are both good coconut-growing areas, the total acreage under coconut cultivation in Mysore State has increased substantially and now stands at about 2½ lakhs of acres. Natural facilities for retting exist in the North Kanara District and although the delegation has not visited South Kanara, it is felt that similar facilities would be available in South Kanara also. The former Government of Bombay have taken active steps to develop the coir industry in the North Kanara District and three Coir Extraction and Spinning Institutions are working in different places in this area to impart training in improved methods of coir extraction and spinning. Besides, there are one Factory-cum-Training Institute at Honavar and a peripatetic school at Kumta for giving training in the manufacture of coir goods such as mats, mattings, etc. The quality of products made in this area compare well with those made in Kerala. As in other States, here also the practice of de-husking the nuts only months after plucking limits the availability of good husks for the coir industry and the scope for the manufacture of good coir yarn and other products.

As in North Kanara, it is felt that the industry could be developed in South Kanara also to the extent facilities exist. As regards the rest of the Mysore State where there are more than 1,70,000 acres under coconut cultivation, the Government of Mysore are now running two Production-cum-Training Centres, one at Nanjangud and the other at Hosadurga for the manufacture of coir products using fibre made in the surrounding villages by retting husks in fresh water creeks and channels. The fibre made in villages near Nanjangud, as observed by the delegation, is not of good colour and the possibility of producing fibre of really good quality by retting in fresh water yet remains to be proved. It is also seen that the villagers have not so far taken up the production of coir yarn or other coir articles themselves. However there is vast scope for the introduction of the mattress and bristle fibre manufacturing industries all over the State of Mysore at suitable centres for the commercial exploitation of the vast quantities of husk which are now being burnt or otherwise wasted. In fact one Mr. Hanumantha Rao of Arsikere has, after years of trial, devised some machines for the manufacture of mattress and bristle fibre and they are installed and are now working in his factory at Arsikere. This is the only factory of its kind seen by the delegation in the course of its tour for the manufacture of mattress and bristle fibre and it is found that the equipment is functioning fairly satisfactorily. The delegation understands from Mr. Hanumantha Rao that he does not find any difficulty in marketing the bristle fibre to brush manufacturing concerns in Bombay, etc., and the mattress fibre locally but that he has not been able to work the factory regularly on commercial lines for want of funds. No grading of the bristle fibre is being attempted by him at present. The delegation feels that this industry should be encouraged and the establishment of similar units at other places also organised. The delegation had an opportunity to meet Shri Beemappa Naik, Minister for Co-operation, Government of Mysore, at Arsikere and the delegation brought to his notice the desirability of assisting the industry at Arsikere.

Madras State

After the States reorganisation and the transfer of Malabar and South Kanara Districts which are highly coconut-growing areas, the acreage under coconut cultivation in the Madras State would be at present only about one lakh of acres. The bulk of this acreage is confined to Tanjore District. It

is understood that 50 per cent of the coconuts produced in this area are de-husked when they are green and the remainder only after they become dry. The present Madras State has a long coast line but there are at present no training or production centres in this area for developing coir retting. It is however understood that some centres are being opened for the development of this industry. The Assistant Director of Industries and Commerce, Tanjore brought to the notice of the delegation that one such centre has already been sanctioned to be opened in Vedaranyam area. The delegation feels that it may be possible to develop coir retting and the manufacture of coir yarn and other products in the coastal area at centres where back-water or similar facilities exist. Besides, there is considerable scope for the development of the mattress and bristle fibre industry at suitable centres to make use of the husks available in the interior areas. From the discussion the delegation had with some local people in Tanjore it is observed that there is also a certain amount of local interest to take up the industry.

As already observed in the previous report, the delegation had to confine itself, during the course of its tours so far made, to making an on-the-spot study of the possibilities of manufacturing mattress and bristle fibre in the coconut-growing States in India. The delegation has also taken the opportunity to study other relevant problems connected with the coir industry in the areas visited. According to the resolution appointing the delegation, it has to study also the methods adopted in Ceylon for the manufacture of mattress and bristle fibre and to examine the possibilities of applying the above methods to areas in India where there are no retting facilities. The final report of the delegation will be submitted after its tour in Ceylon.

The delegation places on record its appreciation of the devotion and high sense of duty evinced by Shri A.C. Appu, the Ministerial Assistant, who accompanied the delegation.

(Sd.)	B. NARASIMHA RAO
"	A. KARUNAKARA MENON
"	N. NARAYANA KURUP
"	M. C. MATHEWS
"	S. C. ROY
"	P. K. DEWER (Leader)

APPENDIX III

Statement showing district-wise figures of production of coconuts in the coconut-growing States of India during the year 1954-55

(Source : Coconut Committee)

Figures for subsequent years are not available

<i>Districts</i>	<i>Area in Acres</i>	<i>Production of coconuts in thousands</i>	<i>Per cent of total</i>
<i>Kerala State</i>			
1. Trivandrum	142,39	398,776	15
2. Quilon	265	742,000	27
3. Kottayam		489,000	18
4. Trichur		241,000	9
5. Malabar (including Kasaragod)	430,277	870,365	31
Total	1,098,502	2,741,141	100
<i>Bombay State</i>			
1. Ratnagiri	15,897	23,846	81
2. Kolaba	1,827	2,741	9
3. Thana	805	1,208	4
4. Saurashtra (Gohilward and Sorath)	950	950	3
5. Bombay	360	540	2
Others	122	185	1
Total	19,961	29,470	100
<i>Madras State</i>			
1. Kanyakumari	27,579	77,221	19
2. Tirunelveli	4,513	13,539	3
3. Ramanathapuram	5,980	17,940	4
4. Madurai	8,500	25,500	6
5. Nilgiris	6	12	..
6. Coimbatore	11,715	35,145	9
7. Salem	9,858	29,574	7
8. Tiruchirapalli	7,233	21,699	5
9. Tanjore	35,779	143,116	34
10. South Arcot	3,084	9,252	2
11. North Arcot	11,158	33,474	8
12. Chingleput	3,914	11,742	3
Total	129,319	418,214	100

<i>Districts</i>	<i>Area in Acres</i>	<i>Production of coconuts in thousands</i>	<i>Per cent of total</i>
<i>Andhra Pradesh</i>			
1. Chittoor	2,417	7,251	2
2. Nellore	323	969	1
3. Cuddapah	34	252	
4. Anantapur	374	1,122	
5. Kurnool	25	225	
6. Guntur	110	330	
7. Krishna	980	2,940	1
8. East Godavari	55,013	214,551	69
9. West Godavari	11,784	45,957	15
10. Visakhapatnam	2,083	6,249	2
11. Srikakulam	10,465	31,395	10

Total	83,708	331,241	100
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<i>Mysore State</i>			
1. Mysore	11,274	14,756	3
2. Mandya	8,576	39,673	7
3. Bangalore	7,644	4,738	1
4. Kolar	1,080	2,122	..
5. Tumkur	64,793	44,803	8
6. Hassan	43,989	175,893	31
7. Shimoga	857	2,750	..
8. Chikmagalur	20,583	181,435	32
9. Chitaldrug	13,931	15,561	3
10. Bellary	1,107	313	..
11. Dharwar	370	551	..
12. North Kanara	11,551	17,327	3
13. South Kanara	29,245	68,713	12
14. Coorg	122	394	..

Total	215,122	569,029	100
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<i>Assam State</i>			
1. Kamrup	1,600	10,230	80
2. Nowgong	300	1,918	15
3. Darrang	100	639	5

Total	2,000	12,787	100
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Districts	Area in Acres	Production of coconuts in thousands	Percent of total
<i>Orissa State</i>			
1. Puri	7,594	23,390	79
2. Cuttack	2,600	5,760	20
3. Balasore	215	91	1
4. Others*	59	135	
Total	10,468	29,376	100

<i>West Bengal State</i>			
1. Burdwan	322	435	2
2. Birbham	20	27	..
3. Hooghly	1,696	2,290	10
4. Howrah	5,659	7,640	35
5. Midnapore	650	890	4
6. Bankura	1	1	..
7. 24 Parganas	7,487	10,107	46
8. Murshidabad	229	309	1
9. Nadia	330	445	2
10. Malda	2	3	..
11. West Dinajpure	7	9	..
12. Jalpaiguri	36	49	..
Total	16,448	22,205	100

APPENDIX IV Tour Notes

Colombo, Saturday, 9th August 1958.

Place visited.—

Fatima Fibre Mills, Canal Road, Hondala, Wattala.

(Proprietor : Mr. Basil Jayawardane)

about 9 miles from Colombo.

The mill is situated on the banks of a canal on the Canal Road.

Equipment

1. One Oil Engine 66 b. h. p.

2. Seven pairs of combing drums:—Each drum is about 3 feet in diameter and about 14 inches wide. The drum has on its periphery long iron nails fixed radially at a spacing of about $\frac{1}{2}$ inch. The nails are about $2\frac{1}{2}$ inches long, with more than half projecting outside. Nails on the second of the pair of drums are finer and more pointed than on the first one. The drums are fixed on an

—* Ganjam, Dhinkenal, Keonjhar and Koraput.

horizontal shaft and are rotated at a speed of about 200 revolutions per minute. In front of each drum are two iron rods driven from the shaft. Soaked husks are held firmly between these rods by the operators against the revolving nails. In the first drum, the outer skins of the husk and some of the pith are removed, while in the second the remaining pith and smaller fibres are removed and the longer fibres alone remain in the hands of the operator. The longer fibres are then washed in warm water in a washing tank about 12' x 5' x 3' and dried in the open. After drying, this fibre is cleaned by hands by women and bundled by men for the market as Bristles Fibre.

In this mill, there are seven such pairs of drums of which only five are generally in operation.

The pith and the small fibres falling from the drums are carried to a sifter, where the fibre is separated from the pith.

Sifter

It is a long conical drum about 12 feet long with only a wire mesh covering on the surface and rotated on a horizontal shaft. This drum is about 4 feet in diameter at the feeding end and about 7 feet in diameter at the discharging end. The fibre and pith dropped by the combing drums are fed into this sifter. While passing through the same, the pith gets separated and falls down through the wire meshes and cleaned fibre is discharged at the delivery end. The cleaned fibre is then dried in the open and balloted for the market.

Balloting Press

This is a horizontal wooden chamber about 10 feet in length and 3½ feet in height with two compartments at either ends. A pinion at the centre operates a rack horizontally within the chamber. Fibre is fed into each compartment alternatively and is pressed into bales by the movement of the rack. Each bale is about 24" x 12" x 9" and weighs about 12 lb.

According to the Proprietor, 1,000 husks produce about ¾ cwt. of bristles and ¼ cwt. of mattress fibre. The price of husk varies from Rs. 12 to Rs. 15 per 1,000. Mattress and bristle fibres are sold at Rs. 11 and Rs. 25 per hundredweight respectively to the Shippers. Each pair of the combing drums processes on the average 2,000 husks per day of 8 hours. About 45 workers both men and women—are employed in the mills and their wages range from Rs. 2.00 to Rs. 3.50.

Karawallapitiya Matagoda Co-operative Society Ltd. No. 22.—From the Fatima Mills we went to a village uplift centre about 2 miles from the place, where the Karawallapitiya Co-operative Society is training young girls in coir yarn spinning.

There are two Rats (Spinning wheels, similar to those in Kerala). They do not produce fibre but purchase the same from nearby fibre mills, which costs them Rs. 25 a hundredweight. The yarn produced is sold locally.

Colombo 11th August 1958

Place visited:—

Fatima Fibre Mills, Weligampitiya, Jaela.

Proprietor:—Mr. W. Waas.

Equipment

1. A national Oil Engine 35 b.h.p. 300 r.p.m. is installed in the mill to drive all the machinery.
2. Four sets of combing drums and one sifter are installed. The drums are as usual 3 feet in diameter, drive at about 200 r.p.m.
3. Sifter is 14 feet long and 4 feet in diameter at the feeding end and 7 feet in diameter at the discharging end. This is driven at about 45 r.p.m.
4. One hand driven balloting press is also installed to bale the mattress fibre.
5. A washing tank for the bristle fibre, a soaking tank for soaking the husks, a drying yard are also provided.

General remarks

It is stated that each pair of drums can handle on the average 2,200 husks a day of 8 hours and that the 4 pairs of drums in this mill handle about eight to nine thousand husks a day. It is also stated that the price in this area is about Rs. 17 to Rs. 20 per 1,000 coconut husks. It is understood that the husks of 1,200 coconuts give one hundredweight of dried bristled fibre and 2 hundredweight of mattress fibre. It is also stated that the minimum prices of mattress and bristle fibre are Rs. 11 and Rs. 25 per hundredweight respectively and that superior quality of fibre obtains a premium on the above prices.

Each pair of drums is reported to cost about Rs. 1,000 and each sifter about Rs. 1,500.

Tuesday, 12th August 1958.

Place visited:—

Marawila Coconut Producers' Co-operative Society, Limited, Marawila.

This is a prosperous Co-operative Society with 160 members on its rolls. It started with a share capital of Rs. 41,000 only, but this has been increased to Rs. 4,38,199.82 as on 31st December 1956 by capitalising a portion of the profits.

The main activities of the Society are the purchase of coconut and coconut husks from its members and the manufacture and sale of mattress and bristle fibre, copra, desiccated coconuts, coconut oil, etc. The manufacture of fibre is carried out with the following equipment.

Equipment

1. Robson Oil Engine 50 b.h.p., 280 r.p.m.
2. Six pairs of combing drums.
3. One sifter.
4. One Balloting Press.
5. Soaking Tank.
6. Washing tank, etc.

The husks are purchased at Rs. 19 per 1,000 husks. It is stated that the coconuts are de-husked from 21 to 45 days after plucking. The number

of husks handled per day is 8,000 to 10,000 in this mill. It is stated that 1,000 husks yield 1 hundredweight of bristle fibre and 2 hundredweight of mattress fibre. The floor prices of mattress and bristle fibre are Rs. 11 and Rs. 25 per hundredweight respectively. It is stated that this mill obtains a premium of Rs. 11 per hundredweight on its bristle fibre.

The Society purchases coconuts at about Rs. 150 per 1,000 nuts. The average number of trees in this area is 65 per acre and the average yield per acre is 2,400 nuts per year.

Equipment installed in the other sections of this factory is as follows :

Desiccated Coconut Section.

1. Diesel oil Engine 60 b.h.p.
2. One Disintegrator.
3. Six double desiccators.
4. One sifter.

The dehusked coconuts are first shelled and then the thin outer skin of the kernel is pared by women. The pared kernel is broken into pieces and fed into the disintegrator. The disintegrated powder is dried in the desiccator and afterwards graded in the sifter into fine and medium qualities. The graded powder is then packed in paper bags or wooden chests.

Oil Section.

The oil section is intended to deal with the parings obtained in the process mentioned above as well as copra. The equipment installed consists of one disintegrator, one dryer, one expeller, one filter press, etc.

The mill has also drying chambers for making the usual quality copra and white copra. The coconut water and the washings are also collected in tubs and the resulting scum is boiled to yield an inferior quality of coconut oil. The biproducts of the oil made out of the scum is a kind of punnac which is considered to be a good manure.

Katunayake Co-operative Coir Societies Union, Limited.

We proceeded in the afternoon to Katunayake and visited the coir manufacturing factory run by the Katunayake Co-operative Societies Union, Limited. There are 80 mat looms and 10 matting looms here. The buildings and equipment belong to the Government and a rent of Rs. 510 per annum is charged to the Society. About 50 persons are employed daily. Tea bags and mats and mattings are being made. Yarn and fibre are purchased from member Co-operative Societies and other Co-operative Societies. There are 13 member societies in this Union. This union runs a Showroom in Colombo where their products are exhibited.

This factory was first established by the Government in 1938 and then handed over to this Co-operative Union in 1952. The Society's total sale came to one lakh of rupees in 1957, and it made a gross profit of Rs. 10,000. Retted fibre is purchased at Rs. 30 per hundredweight. They use retted fibre and yarn made out of retted fibre. It is said that they pay the workers for plain fibre mat a wage rate of Rs. 1.50 per square feet.

Wednesday, 13th August 1958

Visited Sandalanka Coconut Producers Co-operative Society, Ltd., Sandalankawa.

This society was started in 1948. The membership is stated to be 1,863 and the acreage under the society is 13,765. The share capital is Rs. 82,000 and it is reported that Rs. 17 lakhs of the surplus income has been capitalised in addition to giving a rebate of Rs. 2,25,000 to the members.

The following are the activities of the society :—

1. *Mattres and Bristle Fibre Section.*—The equipment installed is as follows :

1. Ruston Hornsby Engine 8 H.R. Clars r.p.m. 280
2. Eight pairs of combing drums.
3. One Sifter.
4. One Balloting Press.
5. One soaking tank, etc.

The husks are soaked in the tank for about 3 weeks. One pair of drums is stated to handle 2,500 husks per day. One thousand husks are reported to give 1 hundredweight of bristle fibre and $1\frac{1}{2}$ hundredweight of mattress fibre. It has been observed that the husk drums are running at about 400 revolutions per minute and the fibre drums at about 200 revolutions per minute.

The price of husks ranges from Rs. 10 to 16 per 1,000 and the current price is Rs. 12 per 1,000 husks.

II. Decorticated fibre Section.—This is one of the few mills in Ceylon having this kind of equipment, supplied by Messrs D.W. Down and Son, (Tropical), Ltd., Glemsford, England. The equipment consists of one Husk bursting mill or disintegrator and one sifter. The disintegrator bursts open the husk and the sifter completes the opening and removes the greater part of the dust and short fibres. The fibre is discharged from the outlet of the sifter while the dust and short fibres are discharged from both the machines. A 40 b.h.p., motor is installed to drive the disintegrator and a 60 b.h.p., motor for the sifter.

It is stated that the out-turn of these machines is 1,000 husks per hour in one beating and 600 to 750 husks per hour in double beatings. The society has purchased this machine through Messrs Brown and Co., Colombo, in 1953 and its total cost including cost of erection etc., is stated to be Rs. 35,000. One thousand husks give an out-turn of $2\frac{1}{2}$ hundredweights of fibre in this equipment. It may be observed that in this equipment bristle fibre is not separated from the mattress fibre. The resulting fibre is stated to fetch a slightly higher price than mattress fibre, i.e., a price of Rs. 12, a hundredweight as against the floor price of Rs. 11, a hundredweight for mattress fibre.

The fibre obtained is balloted before sending it on to the baling press.

Baling Press section.—A hydraulic Baling Press of 400 tons capacity manufactured by John Shaw & Sons, Salford is installed in this section. The working pressure is stated to be 2 tons per square inch. The out-turn of the press is 40 bales per day of 10 hours, each bale being 9 cubic feet in volume and $2\frac{1}{2}$ cwt. in weight. The cost of the press (purchased second hand) including all accessories and erection is stated to be about 1 lakh of rupees.

Oil Pressing section.—One Disintegrator, one dryer, two Anderson Oil Expellers (without steam kettles) and one filter press are installed in this section. The capacity is stated to be 24 tons of copra per day of 24 hours. It is understood that the dryer is not required if the expellers are provided with steam kettles.

Desiccating section.—One Devil disintegrator, six double desiccators and one sifter are installed in this section. The desiccated meal is graded into fine and medium and is packed in 100 lb. bags or 100 lb. chests. The disintegrator can handle one lakh nuts per day of 24 hours.

Copra, coconut shell charcoal etc. are also made by this society.

Fibre Hackling and Twisting Section.—The bristle fibre is hackled by hand by combing on a single row of long iron spies fixed vertically to stable about $\frac{3}{4}$ inch apart from each other. The shorter fibre removed in this hackling process is called omatt fibre. This fibre is twisted into the form of a crude rope about $\frac{3}{4}$ inch in diameter. This kind of rope is said to have some limited demand in Germany and other European countries.

Thursday, 14th August 1958.—Visited Moosajees Fibre Stores and Baling Plant in Colombo.

Messrs. Moosajees Limited are one of the four main exporters of fibre from Ceylon. They purchase mattress and bristle fibre before exporting the same. The bristle fibre is also hackled and cut to sizes for export. They also make twisted fibre using power operated twisting machines.

The following equipment is installed in these premises :—

Two hydraulic baling press, a power operated hackling machine, and three power operated fibre twisting machines.

The out-turn of each press is 40 bales of 3 cwt. each per hour. The out-turn of both the presses is stated to be 150 tons per 12 hours. The cost of one of the presses is stated to be Rs. 10 lakhs including installation charges and that of the other rupees six lakhs. The first press has a 155 K.W. Motor and the second a 150 h.p. motor. The presses are supplied by Messrs. Lindemann of Dusseldorf, Germany. The working pressure is 400 kg/sq.

The working of the power operated hackling machine is stated to be not satisfactory and most of the hackling is done by hand. The following are stated to be the ruling C.I.F. prices to the United Kingdom :—

Mattress fibre	£	36	to	38	per ton.
Bristle fibre	£	56	to	61	per ton.
Omatt fibre	£	50	to	52	per ton.

It is understood that the mattress fibre is used for upholstery and that the bristle and omatt fibre are used for upholstery, insulation and for making yarn for fishing nets, etc. However specific information about the end uses of these fibre is not available.

Friday, 15th August 1958

Visited the Government Coconut Research Institute at Lunuwilla. The Director of the Institute took us round and explained the several aspects of the work on which they were engaged. It was however found that they had not so far carried out any appreciable work on coconut fibre.

The area under coconut in Ceylon was stated to be about one million acres and it was stated that the production was about 1,800 nuts some years

back but that it has now increased to 2,700 nuts per acre. One of the chemists informed us that he had conducted an investigation into the average weight of a coconut and its component parts and that the following are the figures obtained by him.

For an average nut after one month's seasoning :—

Weight of unhusked nut	..	1,053 grams
„ de-husked nut	..	640 „
„ Kernel	..	339 „
„ Shell	..	177 „
„ Nut water	..	124 „
„ Copra (6% moisture)	..	194 „

Oil content of estate No. 1 copra is 68.3 per cent.

The same chemist informed us that he has also carried out investigations into the size distribution of the nuts and that the percentage distribution of the different sizes is as follows :—

<i>Diameter at the waist portion</i> <i>Inches</i>	<i>Percentage of total</i> <i>production</i>
5	0.31
6	10.00
7	51.27
8	33.91
9	4.39
10	9.12

Similar investigations have to be carried out in respect of nuts in India by our institute to ascertain the average fibre contents of Indian nuts.

Saturday, 16th August 1958

Visit to Galle and Southern areas of Ceylon

Before undertaking this tour, arranged specially at our request, we met Mr. Samara Singhe, Director of Rural Development and Cottage Industry and Mr. Alagaratnam, Assistant Director, on the afternoon of 14th August 1958. We discussed with the above officers conditions the coir yarn industry as prevailing in the Southern parts of Ceylon. The retting of the husks, the spinning of yarn and the manufacture of coir products in this area are carried out on lines similar to those prevailing in India especially in Kerala. Over large parts of the coastal area in between Colombo and Galle, Lagoons and backwaters exist and retting is being carried out in those waters, the period of retting being six to eight months. There are a few places where retting is also being carried out in large pits adjoining coastal areas. These pits are found dug between rows of coconut palms.

The following are the places that we visited :—

Bodimaluwa Coir Workers' Co-operative Society, Vabtolu

The main activities of this Society are the purchase and retting of husks, distribution of retted husks for making yarn and the manufacture of Board mats on a small scale. There are 120 members in this society and the annual out-turn is stated to be Rs. 12 000. Green husks are purchased at Rs. 12 per thousand. The retted husks are distributed to members at Rs. 33

per 1,000 husks. Superior yarn for fishing nets fetches a price of Rs. 0.44 per pound in this area. It is stated that one thousand husks yield $2\frac{1}{2}$ cwt. fibre or 2 cwt. of good quality yarn. The average earnings are stated to be Rs. 1.50 for retting 1,000 husks and Re. 1 per day for spinning yarn. One of the main objects in organising this co-operative society is the stabilisation of market prices.

Heenatiya Coir Yarn Workers' Co-operative Society, Balapitiya

The main activity of this society is the purchase of green husks to the members. There are, it is stated, 111 members of whom about 60 are actual workers. In this society the green husks are first crushed by pounding with an iron pestle and it is stated that the retting time is thereby reduced to about 3 months. The price of 1,000 green husks is Rs. 20 in this area. The actual cost of retting is stated to be Rs. 8 to Rs. 10. The retted husks are issued to the members at Rs. 34 per 1,000 husks. One thousand husks are reported to give $2\frac{1}{2}$ cwt. of fibre or 2 cwt. of yarn. The local price of yarn is stated to be Rs. 37 per hundredweight.

Madampe Coir Production Depot

In and about this place there are a large number of looms engaged in the manufacture of bags for the storage of salt as well as tea leaves. This Government Depot has been established for the purchase and sale of the above bags with a view to mainly stabilising the prices. The salt bags are made out of Omatt mill fibre, weigh about 2.25 lb. and cost Rs. 1.12 each. The tea leaves bags are made of yarn spun out of retted fibre, weigh about 4.25 lb. (with handle) and cost Rs. 4.50.

The following statements secured by us during the course of our visits and discussions are enclosed :—

(1) Statement furnished by Sandalankawa Coconut Producers' Co-operative Society Limited, giving cost of production of mattress and bristle fibre, decorticated fibre, etc.

(2) Statement regarding export of all forms of coir products from Ceylon from 1955 to January-May 1958.

Cost of Production of Mattress and Bristle Fibre in Ceylon*Cost per cwt.***Rs. cts.**

Transport of Husks to the Soaking Pit	..	1'00
Expenses in the Soaking Pit	..	0'10
Removal of soaked husks to Factory	..	0'40
Breaking of husks	..	0'30
Nailing	..	2'00
Sifting	..	0'15
Cleaning of boxes	..	0'25
Removing fibre dust	..	0'55
Typing	..	0'93
Removal of Fibre to Stores	..	0'05
Loading	..	0'05
Fuel	..	0'57
Depreciation of Building and Machinery	..	0'20
Supervisory charges	..	0'25
Total	..	6'80

Cost of Production of Decorticated Fibre*Cost per cwt.***Rs. cts.**

Transport of Husks	..	0'10
Labour wages all inclusive	..	1'80
Electricity	..	0'75
Building and Machinery Depreciation	..	0'75
Supervisory charges	..	0'10
Total	..	3'54

Baling Expenses*Per ton.***Rs. cts.**

Labour wages all inclusive	..	6'40
Current and Fuel	..	4'00
Building and Machinery Depreciation	..	5'00
Repairs	..	0'50
Insurance and Supervisory expenses	..	1'15
Total	..	17'05

Cost of Production of Oil

		<i>Per ton</i>
		<i>Rs.cts.</i>
Transport of copra to cutter	..	2'64
Disintegrating of copra	..	2'18
Colombo drier exp.	..	2'50
Wages at the Expeller	..	3'43
Filtering of Oil	..	0'93
Poonac Gunnies	..	3'30
Bagging of Poonac	..	0'77
Firewood	..	3'50
Electricity	..	2'50
Depreciation of Building and Machinery	..	2'50
Supervisory charges	..	2'50
		<hr/>
Total	..	26'75
		<hr/>

(The above figures have been supplied by the Coconut Producers Co-operative Society Sandalankawa, Ceylon.)



सत्यमेव जयते

Export of Coir Fibre and Yarn from Ceylon to foreign Countries

Year	British Fibre		Mattress Fibre		Coir Yarn		Total	
	Quantity (cwts.)	Value (Rs. 000's)	Quantity (Cwts.)	Value (Rs. 000's)	Quantity (Cwts.)	Value (Rs. 000's)	Quantity (Cwts.)	Value (Rs. 000's)
1955	349,271	..	10,57,156	..	58,596	..	14,65,023	..
1956	320,366	10,277	10,56,114	15,104	43,468	2,357	14,19,948	27,738
1957	312,374	14,320	11,30,205	19,541	34,444	1,957	14,77,024	35,818

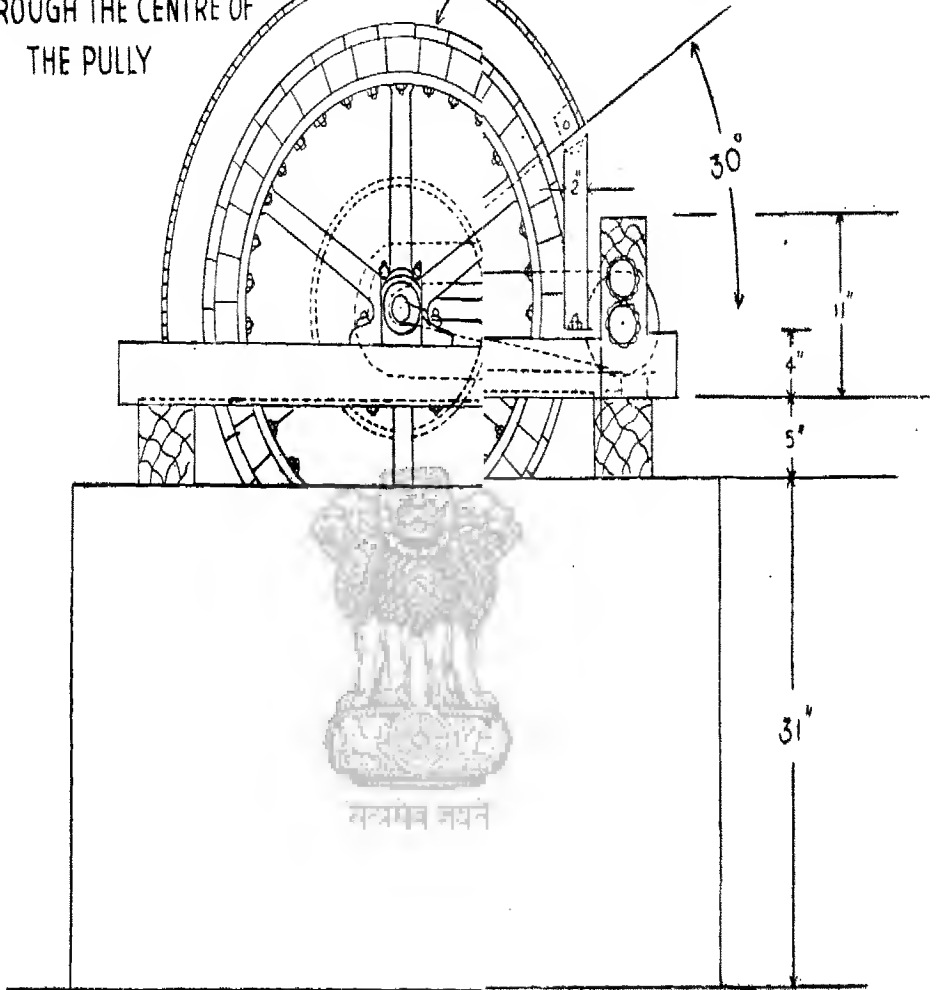
Note.—Value of exports for 1955 is not available.

Source.—Reports of the Ceylon Chamber of Commerce and Ceylon Customs Returns.

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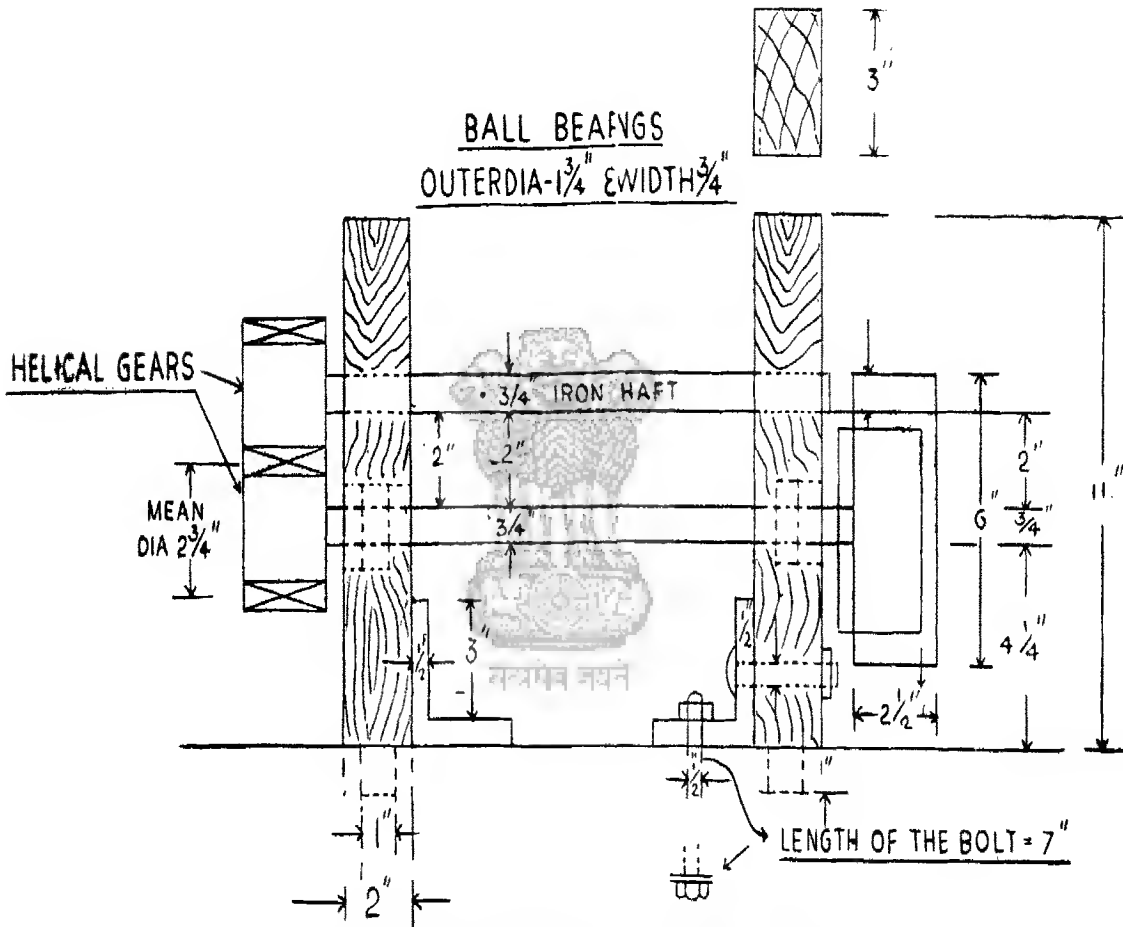
SECTION OF COVER SHOWN
THROUGH THE CENTRE OF
THE PULLY

3"X14" WOODEN PIECES
NAILED TO DRUM (NAILS NOT SHOWN)

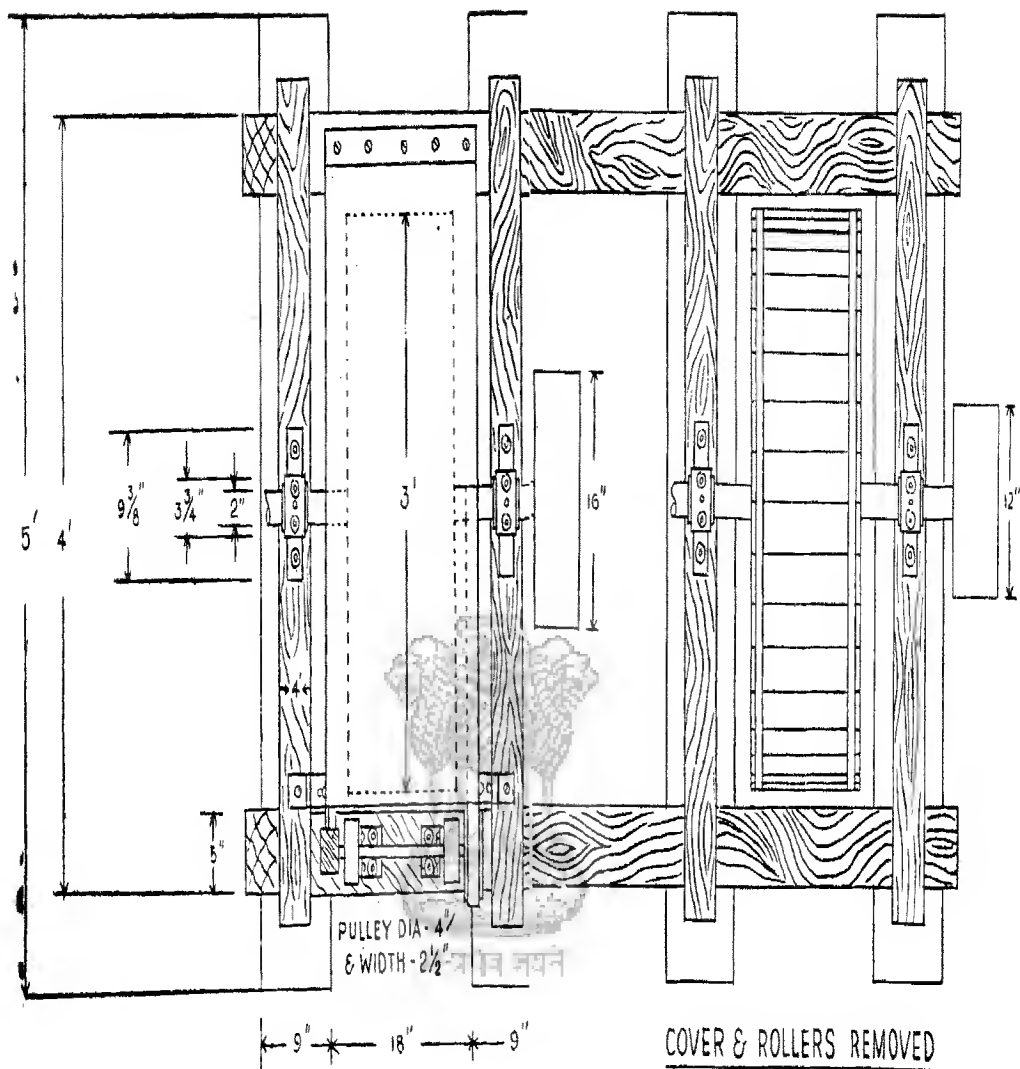


SECTION

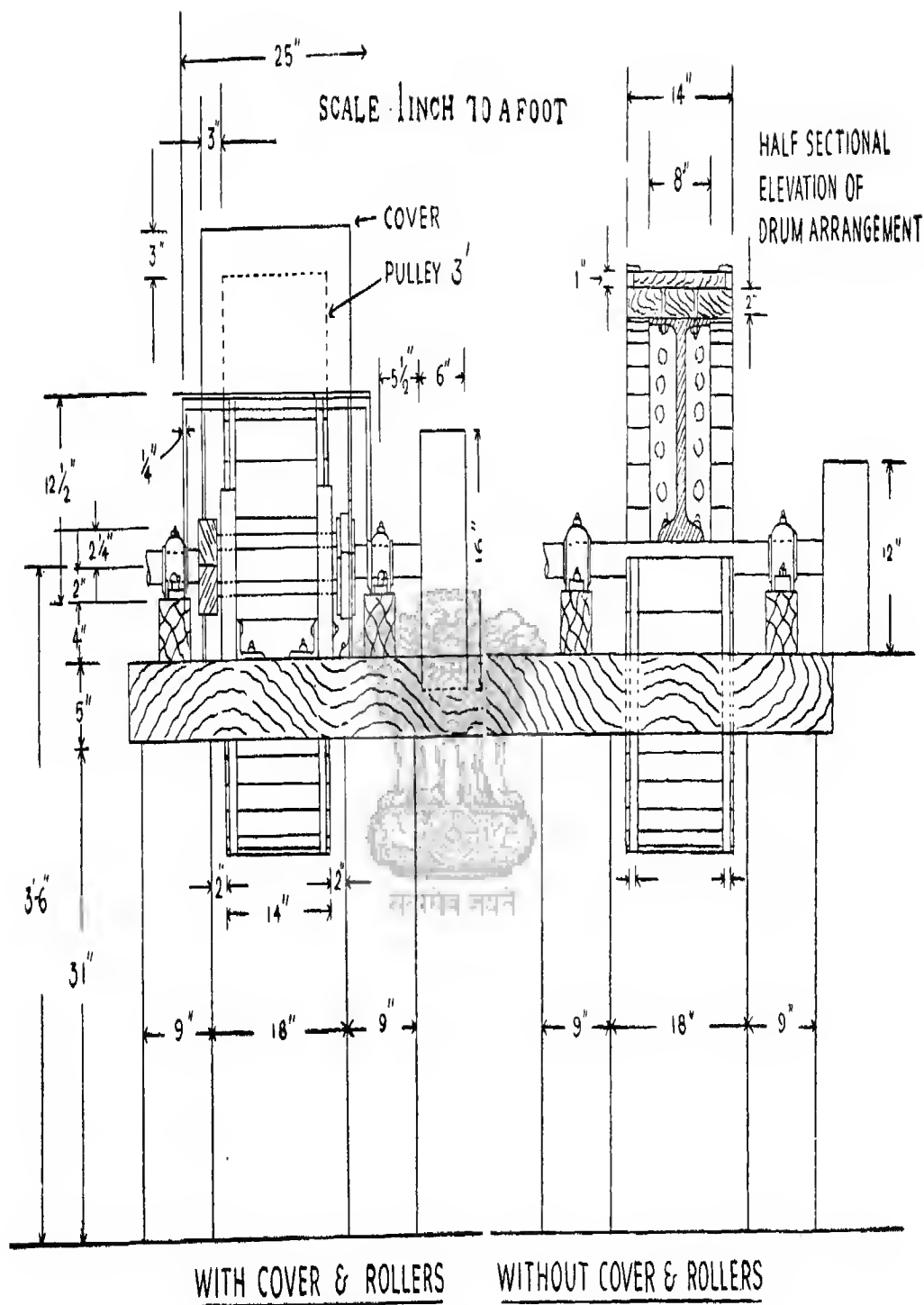
SCALE 3 INCHES TO FOOT



ARRANGEMENT C FEEDING SHAFTS



FAN



FRONT ELEVATION